

Prepared for:

Van Hook Gathering Services, LLC

Prepared By:

**Ramboll US Corporation
Newark, New Jersey**

Date:

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Project Number:

1690007407

TRIBAL NSR REGISTRATION

VAN HOOK GATHERING SERVICES

ANDEAVOR CDP

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1. INTRODUCTION

1.1 Summary

Van Hook Gathering Services, LLC (VHGS) is submitting this registration application for the Andeavor Central Delivery Point (CDP), an integrally connected central gathering location for gas from the oil production pads in the Van Hook area. The Andeavor CDP is an oil and natural gas production facility under the Fort Berthold Indian Reservation (FBIR) Federal Implementation Plan (FIP). The Andeavor CDP is an existing facility that had potential emissions below the registration thresholds in the Tribal NSR rule, since when it was built by Zenergy in December 2010. The operation of the CDP is being changed and will exceed the registration thresholds. The Oil and Natural Gas Minor Source Registration Part 1 Form is included in Attachment A to apply for registration.

1.2 Site Location

The Andeavor CDP is located in Section 20, Township 151 North, Range 92 West, Mountrail County, on the Fort Berthold Indian Reservation (FBIR) in North Dakota.

2. NARRATIVE DESCRIPTION

2.1 Description

This section of the application provides a detailed description of the operations at the Andeavor CDP. The three current operations conducted at Andeavor CDP are gas transport, condensate collection and pigging. Due to increases in production and changes in operations, VHGS plans to install an additional flare tip on the existing main flare stack to honor gas transport obligations, handle higher production, and have more flexible operations. Each of the gas transport, condensate collection and pigging are described below.

Gas Transport

The Andeavor CDP is connected to the Andeavor sales gas line for production well pads in the Van Hook area. The produced gas enters the CDP, where free liquids are removed from the gas by a knockout tank. When the CDP was built, it was originally designed to be an emergency flaring point when the Andeavor pipeline could not take any gas. The gas would temporarily go to the CDP flare and then the CDP would shut down the inlet and the gas would go to flare at the production pads on the gathering system. As part of this system, a 750 barrel produced water tank was installed. The 750 barrel produced water tank is no longer in use, typically runs dry and is not connected to the flare.

Condensate Collection

The produced gas enters the CDP, where free liquids are removed from the gas by a knockout tank. The free liquids are transferred to one of two tanks where they are stored until they are trucked away. Gas vapors from standing and breathing losses from these tanks are piped to a flare.

Pigging Operations

In order to keeping the gas lines open, they need to be pigged regularly. The pigs push oil, condensate and some gas to the CDP. The oil, condensate, and gas go to the three pigging tanks, where the oil and condensate is stored and the gas from these tanks is directed to a flare. The oil and condensate is trucked out, and the standing and breathing losses from the pigging tanks are piped to the flare.

The facility consists of the following primary equipment with the following capacities:

Equipment:

- 3 – 400 bbl Oil/Condensate Tanks (pigging tanks)
- 2 – 400 bbl Condensate Tanks (condensate collection tanks)
- 1 – Water Tank (not connected to flare; see discussion above)
- 2 – Truck Loading Operations
- 2 – Steffes Utility Flares (1 new, 1 existing/backup)
- 1 – Gas Condensate Knockout Tank
- 1 – Backup Shop-built Flare
- Miscellaneous Fugitive Emissions (Fugitives)

Although not currently planned, the following equipment may be installed at the site, in the future, to accommodate potential gas transport obligations. Descriptions of these potential operations are included below. If any of these are to be installed, VHGS will prepare emission calculations.

Pneumatic Controllers

Gas Processing Plant

Engines

Heater Treater

Water Bath Heater

2.2 Facility Flow Diagram

Andeavor CDP Flow Diagram				
Produced Gas From Field	→	Knockout	→	Andeavor Pipeline
			→	Flare
2 Condensate Tanks	→	Gas	→	Flare
	→		→	Truck Loadout
3 Pigging Tanks	→	Gas	→	Flare
	→		→	Truck Loadout

3. EMISSION UNITS

Determination of potential emissions for the Andeavor CDP has been approached in a conservative fashion. The North Dakota methodology for calculating emissions has been used to make the emissions estimates. The expected emissions from the Andeavor CDP make the facility a minor source for PSD permitting. The basis for the PTE emissions is detailed in the following sections.

The following equipment are sources of potential emissions:

1. 3 x 400-bbl Oil/Condensate Tanks (pigging tanks)
2. 2 x 400-bbl Condensate Tanks (condensate collection tanks)
3. Steffes Utility Flares (1 new, 1 existing/backup)
4. 2 x Truck Loading Operations
5. 1 x Engine (emergency generator)
6. Miscellaneous Fugitive Emissions (Fugitives)

Although not currently planned, the following equipment may be installed at the site, in the future, to accommodate potential gas transport obligations. Descriptions of these potential operations are included below. If any of these are to be installed, VHGS will prepare emission calculations.

1. 1 x Heat Treater
2. 1 x Water Bath Heater
3. 1 x Gas Processing Plant
4. Pneumatic Controllers
5. Engine(s)

3.1 Storage Tank VOC Emissions

To estimate the PTE of the tank vapors (working, breathing, standing, and flashing), extended BTEX low pressure oil analyses were taken from representative wells producing out of the same geological region. E&P Tanks 2.0 was used to calculate emissions from tank vapors using the anticipated maximum production rates, area-specific atmospheric pressure and temperature data, representative process operating conditions, and analytical data. The E&P Tanks 2.0 output summary in Attachment C includes all of the necessary input data for the tank emission calculations, such as the vapor rate that is produced from the tanks (scf/bbl), the wt.% of the vapor components, such as VOCs, HAPs, GHGs, etc. The daily oil volume input rate used in the calculations is considered a conservative representation of the oil and condensate handling at the facility.

The production storage tanks are potentially subject to 40 CFR 60 (New Source Performance Standards, NSPS) Subparts Kb, OOOO, and OOOOa. Five of the seven tanks at the facility have a capacity of 400 barrels, which is below the 471.7 barrel NSPS Kb applicability threshold; therefore, NSPS Kb is not applicable for these tanks. The produced water tank has a capacity of 750 barrels. However, the tank would have contained produced water with a maximum vapor pressure (excluding water) of 0.618 psi (4.3 kPa). NSPS Kb does not apply to tanks with a capacity between 471.7 and 949.8 barrels that have a maximum true vapor pressure less than 2.18 psi (15.0 kPa). The gas condensate knockout tank has a capacity of 50 barrels, which is below the applicability threshold for

NSPS Kb. The FIP tank enforceable control requirement of 98% for VOCs is used in the emission calculations.

The pigging tanks are used periodically when pigging operations occur. The condensate collection tanks are used whenever gas is flowing through the CDP. Production is assumed to be evenly split between tanks. The tanks are not currently subject to NSPS 0000/0000a, but they will be monitored for NSPS 0000/0000a applicability as production increases at the facility. However, the facility is subject to NSPS 0000/0000a for fugitive emissions.

3.2 Natural Gas-Fired External Combustion Unit Emissions

There are currently no natural gas-fired external combustion units at the facility. If there was a need for additional separation, a heater treater would be installed. For emission calculation purposes, emissions from a heater treater

3.3 Truck Loading Emissions

The condensate and pigging tanks have truck loadouts. Some trucking is conducted but due to the low volumes of liquids, the emissions are insignificant.

3.4 Fugitive Emissions from Equipment Leaks

Fugitive emissions from equipment leaks and dust are not required to be estimated for purposes of potential to emit within the NSR permitting program; however, they are used to determine compliance with facility-wide permit thresholds. The fugitive emissions primarily consist of leaks from connectors, open-ended lines, valves, pumps, etc. A fugitive emission estimate has been calculated using a conservative component count. This conservative count was applied to the emission factors referenced in EPA Protocol for Equipment Leak Emission Estimates, Table 2-4: Oil and Gas Production Operations Average Emission Factors.

The equipment leaks at the facility are potentially subject to NSPS 0000/0000a.

3.5 Produced Gas Flare Emissions

Produced gas is primarily be sold through a pipeline. However, in the event of emergencies, gathering system problems, or equipment upsets, the gas is sent to a flare(s). High gathering line pressures caused by VHGS and a lower decline rates created by better production techniques has caused more flaring and the need to register the facility. The FIP flared gas enforceable control requirement of 98% for VOCs is used in the emission calculations. The current flare will be used as a backup flare so that produced gas does not need to be vented when the main flare(s) is (are) being repaired.

3.6 Gas Processing Plant

It may be necessary to process gas through a J-T skid or MRU to lower the VOC emissions because of line pressure problems. A typical skid will remove 50-65% of the VOCs from the gas it processes before that gas is sent to a flare. Depending on the type of plant, it may be subject to 0000a requirements, with which VHGS will comply. If bullet tanks are brought on the facility and contain more than 10,000 pounds of flammable liquids, the site becomes subject to 40 CFR Part 68, Risk Management Plan (RMP) rule. An RMP would be submitted to EPA if that is the case.

3.7 Pneumatic Controllers

Pneumatic controllers are sometimes used on dump valves in situations where it is necessary to provide more effective control over the dumping process. The pneumatic controllers are also used to control gas supplies to heaters. The pneumatic controllers will typically be the intermittent type. All controllers will be types that are acceptable under NSPS OOOO or OOOOa. The emissions are considered insignificant for the PTE calculations.

3.8 Engines

Engines may be used for compression for refrigeration or J-T operations, gas sales, gas lift, or supplemental electrical generation. The engines can be gas or diesel powered. All engines will be operated in accordance with NSPS and Nonroad engine standards appropriate for the specific engine and purpose. The engines are leased from companies that own and operate the engines and who are responsible for compliance with Federal environment standards.

4. EMISSIONS

4.1 Actual Emissions

Because the facility is impacted by many factors beyond our control, the actual emissions are projected based on potential production. Actual emissions will be less.

4.2 Estimated Operating Schedule

The operating hours is assume to be 24 hours, 7 days a week, 365 days per year. This is conservative, since expected operations will be less than this schedule.

4.3 Summary of Emissions

Based on the operating schedule a summary of the source and the emission calculations contained in Attachment D, the emissions for each source are summarized in the table below:

Emissions per source (TPY)										
Source	VOC	HAP	NO _x	PM	PM ₁₀	PM _{2.5}	CO	H ₂ S	SO ₂	HCHO
Oil/Condensate Tanks	0.26	0	0.02	0	0	0	0.11	0	0.05	Neg.
Produced Water Tanks	0	0	0	0	0	0	0	0	0	Neg.
Casing Head Gas	228.5	3.66	41.51	3.16	3.16	3.16	225.87	0	0	0.03
Treater Burner	0	0	0	0	0	0	0	N/A	0	Neg.
RICE Engine	5.79	1.51	11.59	1.08	1.08	1.08	23.17	N/A	0.01	1.51
Truck Loading	0.17	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel Storage Tank	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Pump	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Controllers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Glycol Dehydrator	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive Leaks	0.91	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Because the facility may be impacted by factors beyond our control, the actual facility total emissions are projected based on potential production:

Part II Application Table D Facility Totals		
POLLUTANT	TOTAL ALLOWABLE	TOTAL ACTUAL
	ANNUAL EMISSIONS (TPY)	ANNUAL EMISSIONS (TPY)
PM	4.24	4.24
PM ₁₀	4.24	4.24
PM _{2.5}	4.24	4.24
SO _x	0.6	0.6
NO _x	53.12	53.12
CO	249.16	249.16
VOC	235.63	235.63
Pb	0	0
NH ₃	0	0
Fluorides	0	0
H ₂ SO ₄	0	0
H ₂ S	0	0
TRS	0	0

Although the equipment covered by this application is currently located at the site (with the exception of the additional flare tip), changes in operations will increase emissions in excess of the minor NSR thresholds identified in Section 49.153 Table 1; specifically, VOC emissions from the casing head gas will increase from less than 5 tpy to 228.5 tpy (an increase of 223.5 tpy), NO_x emissions will increase from less than 1 tpy to 41.4 tpy (an increase of 40.4 tpy) and CO emissions will increase from less than 4.9 tpy to 225.9 tpy (an increase of 221.0 tpy).

5. SUMMARY OF THREATENED AND ENDANGERED SPECIES AND HISTORIC PROPERTIES

Based on species-specific information and the lack of ground disturbance proposed by the Project, Ramboll has concluded that the project qualifies for Criterion B under the FIP; not likely to adversely affect listed T&E species or Critical Habitat. Based on the existing footprint of the facility, and concurrence from TAT THPO, the Project will not affect known historic or cultural resources. If sensitive resources are identified on-site during implementation of the Project, VHGS will coordinate with the appropriate agencies. See Attachment E for the threatened and endangered species and historic properties evaluation.

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**ATTACHMENT A
PART I APPLICATION**



United States Environmental Protection Agency

<https://www.epa.gov/tribal-air/tribal-minor-new-source-review>

January 4, 2017

Part 1: Submit 30 Days Prior to Beginning Construction -- General Facility Information

FEDERAL IMPLEMENTATION PLAN FOR TRUE MINOR SOURCES IN INDIAN COUNTRY IN THE OIL AND NATURAL GAS PRODUCTION AND NATURAL GAS PROCESSING SEGMENTS OF THE OIL AND NATURAL GAS SECTOR

Registration for New True Minor Oil and Natural Gas Sources and Minor Modifications at Existing True Minor Oil and Natural Gas Sources

Please submit information to:

[Reviewing Authority
Address
Phone]

--

A. GENERAL SOURCE INFORMATION (See Instructions Below)

1. Company Name		2. Source Name	
3. Type of Oil and Natural Gas Operation		4. New Minor Source? <input type="checkbox"/> Yes <input type="checkbox"/> No	
		5. Minor Source Modification? <input type="checkbox"/> Yes <input type="checkbox"/> No	
6. NAICS Code		7. SIC Code	
8. U.S. Well ID(s) or API Number(s) [if applicable]			
9. Area of Indian Country	10. County	11a. Latitude	11b. Longitude

B. CONTACT INFORMATION (See Instructions Below)

1. Owner Name	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number
2. Operator Name (if different from owner)	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number
3. Source Contact	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number

4. Compliance Contact	Title
Mailing Address	
Email Address	
Telephone Number	Facsimile Number

C. ATTACHMENTS

Include all of the following information as attachments to this form:

- ☐ Narrative description of the operations.
- ☐ Identification and description of all emission units and air pollution generating activities (with the exception of the exempt emissions units and activities listed in §49.153(c).
- ☐ Identification and description of any air pollution control equipment and compliance monitoring devices or activities that are expected to be used at the facility.
- ☐ Estimated operating schedules.
- ☐ If satisfying the requirements under §49.104(a)(1), documentation that another federal agency has complied with its requirements under the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA) when authorizing the activities for the facility/activity covered under this registration. The appropriate documents shall clearly show that the other federal agency had met its obligations under both the ESA and NHPA. A simple reference to a Record of Decision or other final decision document will not be acceptable. Examples of acceptable documentation would be a letter from the U.S. Fish and Wildlife Service field office (for ESA) or a historic preservation office (for NHPA) stating they agree with the assessment conducted by the other federal agency for the subject project and that the requirements of those statutes have been met. The documentation shall be submitted within the Part 1 registration.
- ☐ If satisfying the requirements under §49.104(a)(2), the letter provided by the Reviewing Authority indicating satisfactory completion of the specified screening procedures to address threatened or endangered species and historic properties. The documentation shall be submitted under the Part 1 registration. (The procedures are contained in the following document: "Procedures to Address Threatened or Endangered Species and Historic Properties for the Federal Implementation Plan for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector," <https://www.epa.gov/tribal-air/tribal-minor-new-source-review>).
- ☐ Other.

Instructions for Part 1

Please answer all questions. If the item does not apply to the source and its operations write "n/a". If the answer is not known write "unknown".

A. General Source Information

1. Company Name: Provide the complete company name. For corporations, include divisions or subsidiary name, if any.
2. Source Name: Provide the source name. Please note that a source is a site, place, or location that may contain one or more air pollution emitting units.
3. Type of Operation: Indicate the generally accepted name for the oil and natural gas production or natural gas processing segment operation (e.g., oil and gas well site, tank battery, compressor station, natural gas processing plant).
4. New True Minor Source: [Per Federal Indian Country Minor New Source Review Rule, 40 CFR 49.153].
5. True Minor Source Modification: [Per Federal Indian Country Minor New Source Review Rule, 40 CFR 49.153].
6. North American Industry Classification System (NAICS): The NAICS Code for your oil and natural gas source can be found at the following link for North American Industry Classification System:
<http://www.census.gov/eos/www/naics/>.
7. Standard Industrial Classification Code (SIC Code): Although the new NAICS code has replaced the SIC codes, much of the Clean Air Act permitting processes continue to use these codes. The SIC Code for your oil and natural gas source can be found at the following link for Standard Industrial Classification Codes:
http://www.osha.gov/pls/imis/sic_manual.html.
8. U.S. Well ID or API Number: Unique well identifier as assigned by the Federal or State oil and gas regulatory agency with primacy, using the American Petroleum Institute (API) Standard for number format (pre-2014) or the Professional Petroleum Data Management (PPDM) Association US Well Number Standard (2014-present). Provide IDs for all oil and natural gas production wells associated with the facility, if applicable. May not be applicable for downstream production sources, such as compressor stations.
9. Area of Indian Country: Provide the name of the Indian reservation within which the source is operating.
10. County: Provide the County within which the source is operating.
11. Latitude & Longitude (11a. and 11b.): Provide latitude and longitude location(s) in decimal degrees, indicating the datum used in parentheses. These are GPS (global positioning system) coordinates. This information should be provided in decimal degrees with 6 digits to the right of the decimal point, indicating the datum used in parentheses (i.e., NAD 27, NAD 83, WGS 84 – WGS 84 is preferred over NAD 27).

B. Contact Information

Please provide the information requested in full.

1. Owners: List the full name (last, middle initial, first) of all owners of the source.
2. Operator: Provide the name of the operator of the source if it is different from the owner(s).
3. Source Contact: The source contact must be the local contact authorized to receive requests for data and information.
4. Compliance Contact: The compliance contact must be the local contact responsible for the source's compliance with this rule. If this is the same as the Source Contact please note this on the form.

C. Attachments

The information requested in the attachments will enable the U.S. Environmental Protection Agency (EPA) to understand the type of oil and natural gas source being registered.

Disclaimers:

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Information in these forms submitted in compliance with the final Federal Indian Country Minor New Source Review rule may be claimed as confidential. A company may assert a claim of confidentiality for information submitted by clearly marking that information as confidential. Such information shall be treated in accordance with EPA's procedures for information claimed as confidential at 40 CFR part 2, subpart B, and will only be disclosed by the means set forth in the subpart. If no claim of confidentiality accompanies the report when it is received by EPA, it may be made public without further notice to the company (40 CFR 2.203).

**ATTACHMENT B
FLARE EFFICIENCY DEMONSTRATION
SUMMARY**



**Steffes Corporation
Dickinson, North Dakota**

**High Pressure Coanda Flare Tip
And
Low Pressure Ball Tip
Performance Testing**

**Test Dates:
July 24 & 25, 2012**

Report Prepared By:

A handwritten signature in black ink that reads "Steve Freeman".

Steve Freeman
Project Manager

**Summary:**

Precision Analysis was contracted to evaluate for compliance, the Steffes Corporation Flare Stacks. Field testing was conducted at the Kodiak Oil & Gas Inc., Smokey 16-20-32-16H3 location in McKenzie County south of Watford City, North Dakota. The high pressure Coanda flare tip and the low pressure Ball flare tip were tested to satisfy the specifications as described in 40 Code of Federal Reference (CFR) §60.18.

- Flare Operates with no visible emissions
 - High Pressure Flare. Confirmed no visible emissions at 27 mscfd and 1403 mscfd.
 - Low Pressure Flare. Confirmed no visible emissions at 17,280 scfd and 106,560 scfd.
- Flame is present at all times
 - Observed thermocouple data logging system of pilot temperature was operational.
- Exit Velocity is less than 400 fps
 - High Pressure Flare. Confirmed exit velocity less than 400 fps for flow rates up to 1.1 mmscfd.
 - Low Pressure Flare. Confirmed exit velocity less than 400 fps for all flow rates tested. Tested to 146,880 scfd.
- BTU content of gas in high and low pressure flare systems was greater than 1,000 BTU/scf which allows an exit velocity of 400 fps. Actual measurements during the test ranged from 1477 to 1774 BTU/scf.

The testing occurred on Tuesday, July 24 and Wednesday, July 25, 2012. Present during the tests were Dean Kovash, Jim Godlevsky, Todd Mayer, and Levi Jurgens from the Steffes Corporation. Kodiak Oil and Gas was represented by Travis Simnioniw and the testers for Precision Analysis were Scott Fairfield and Steve Freeman.

The high pressure Coanda flare tip and the low pressure Ball flare tip performance tests have shown the flares to be operating in accordance to specifications as described in 40 Code of Federal Reference (CFR) §60.18.

Methods:

The following EPA source emissions test methods were used.

40 CFR Part 60, Appendix A

- EPA Test Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate
- EPA Test Method 22 – Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares

GPA METHOD 2261

- GPA Test Method 2261 – Analysis for Natural and Similar Gaseous Mixtures by Gas Chromatography

Analysis for Natural Gas and Similar Gaseous Mixtures by Gas Chromatography

Components to be determined in a gaseous sample are physically separated by gas chromatography and compared to calibration data obtained under identical operating conditions. A fixed volume of sample in the gaseous phase is isolated in a suitable inlet sample system and entered into the column.

ATTACHMENT C
EPA TANKS 4.09D EMISSIONS SUMMARY
OUTPUTS AND CDP INLET GAS ANALYSIS

ATTACHMENT C
EPA TANKS 4.09d Emissions Summary Outputs
and
CDP Inlet Gas Analysis

* Project Setup Information *

Project File : Y:\Projects\Williams Exploration & Production
WEP\WEP211324 Ft. Berthold IR Well Work\E&P Tanks\Van Hook Field 1000 BOPD.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : RVP Distillation
Control Efficiency : 100.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Filed Name : Van Hook
Well Name : Pennington 16-15H and Van Hook 16-14H Averages
Permit Number : Dakota-3 E&P Company, LLC
Date : 2010.09.24

* Data Input *

Separator Pressure : 52.00[psig]
Separator Temperature : 90.00[F]
Ambient Pressure : 13.70[psia]
Ambient Temperature : 50.00[F]
C10+ SG : 0.7970
C10+ MW : 233.494

-- Low Pressure Oil -----

No.	Component	wt %
1	H2S	0.0027
2	O2	0.0000
3	CO2	0.0038
4	N2	0.0008
5	C1	0.0261
6	C2	0.3417
7	C3	1.3723
8	i-C4	0.3662
9	n-C4	1.6928
10	i-C5	0.6858
11	n-C5	1.2496
12	C6	1.4712
13	C7	7.9550
14	C8	19.2940
15	C9	13.4810
16	C10+	49.4241
17	Benzene	0.0470
18	Toluene	0.1281
19	E-Benzene	0.0586
20	Xylenes	0.3912
21	n-C6	1.5420
22	224Trimethylp	0.4660

-- Sales Oil -----

Production Rate : 1000[bbl/day]
 Days of Annual Operation : 365 [days/year]
 API Gravity : 41.5
 Reid Vapor Pressure : 6.20[psia]

 * Calculation Results *

-- Emission Summary -----

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]	
Page 1-----			E&P TANK
Total HAPs	6.040	1.379	
Total HC	836.657	191.018	
VOCs, C2+	823.270	187.961	
VOCs, C3+	649.305	148.243	

Uncontrolled Recovery Info.

Vapor	41.5700	[MSCFD]
HC Vapor	41.3600	[MSCFD]
GOR	41.57	[SCF/bbl]

-- Emission Composition -----

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	1.343	0.307
2	O2	0.000	0.000
3	CO2	1.941	0.443
4	N2	0.412	0.094
5	C1	13.387	3.056
6	C2	173.965	39.718
7	C3	448.169	102.322
8	i-C4	34.294	7.830
9	n-C4	102.418	23.383
10	i-C5	13.956	3.186
11	n-C5	18.394	4.200
12	C6	6.270	1.432
13	C7	10.476	2.392
14	C8	7.517	1.716
15	C9	1.774	0.405
16	C10+	0.002	0.000
17	Benzene	0.156	0.036
18	Toluene	0.111	0.025
19	E-Benzene	0.016	0.004
20	Xylenes	0.090	0.021
21	n-C6	5.168	1.180
22	224Trimethylp	0.493	0.113
	Total	840.352	191.861

-- Stream Data -----								
No.	Component	MW	LP Oil	Flash Oil	Sale Oil	Flash Gas	W&S Gas	Total
Emissions								
			wt %	wt %	wt %	wt %	wt %	wt %
1	H2S	34.80	0.0027	0.0024	0.0001	0.1791	0.1609	0.1631
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.0038	0.0026	0.0000	0.5796	0.1818	0.2307
4	N2	28.01	0.0008	0.0001	0.0000	0.3282	0.0099	0.0490
5	C1	16.04	0.0261	0.0112	0.0000	7.4009	0.7777	1.5911
6	C2	30.07	0.3417	0.2811	0.0024	30.3262	19.3302	20.6806
7	C3	44.10	1.3723	1.3000	0.5065	37.1767	55.5360	53.2811
8	i-C4	58.12	0.3662	0.3594	0.3044	3.7640	4.1203	4.0766
9	n-C4	58.12	1.6928	1.6719	1.5180	12.0581	12.1907	12.1744
10	i-C5	72.15	0.6858	0.6836	0.6696	1.7610	1.6447	1.6590
11	n-C5	72.15	1.2496	1.2474	1.2340	2.3296	2.1666	2.1866
12	C6	86.16	1.4712	1.4725	1.4830	0.8134	0.7577	0.7645
13	C7	100.20	7.9550	7.9683	8.0662	1.3546	1.2768	1.2865
14	C8	114.23	19.2940	19.3310	19.6004	0.9553	0.9145	0.9195
15	C9	128.28	13.4810	13.5078	13.7022	0.2134	0.2208	0.2201
16	C10+	233.49	49.4241	49.5238	50.2483	0.0000	0.0000	0.0000
17	Benzene	78.11	0.0470	0.0471	0.0475	0.0197	0.0184	0.0186
18	Toluene	92.13	0.1281	0.1283	0.1300	0.0137	0.0131	0.0132
19	E-Benzene	106.17	0.0586	0.0587	0.0596	0.0020	0.0020	0.0018
20	Xylenes	106.17	0.3912	0.3920	0.3976	0.0109	0.0106	0.0109
21	n-C6	86.18	1.5420	1.5438	1.5575	0.6517	0.6091	0.6143
22	224Trimet	114.24	0.4660	0.4668	0.4728	0.0617	0.0581	0.0587
MW			137.41	138.18	142.90	36.81	42.83	41.99
Stream Mole Ratio			1.0000	0.9924	0.9456	0.0076	0.0468	0.0544
Heating Value [BTU/SCF]						2105.43	2442.60	2395.38
Gas Gravity [Gas/Air]						1.27	1.48	1.45
Bubble Pt. @ 100F			[psia]	29.55	23.39	7.57		

Page 2-----								E&P TANK
RVP @ 100F			[psia]	15.49	13.82	6.27		
Spec. Gravity @ 100F				0.673	0.674	0.677		

QUESTAR ENERGY SERVICES					
1210 D. Street, Rock Springs, Wyoming 82901 (307) 352-7292					
Description	WHITING CDP INLET				
Company	WPX ENERGY				
Field	VAN HOOK		Meter Number	NA	
Analysis Date/Time	3/5/18 3:27 PM		G.C. Method	QUESGAS, GPA 2286	
Analyst Initials	DEM		Sample Temp.	44	
Date Sampled	3/1/2018		Sample Pressure 44		
Sampled By	BKS		Cont. Number	1056	
Data File	WHITING CDP INLET.gcd		Instrument ID	Shimadzu/GC2014/19cs	
Flowrate	NA		Last Calibration 3/5/2018		
Sample Point	UPSTREAM OF MTR AT INLET				
Component	Mol%		Wt%		LV%
Methane	53.4610		32.0225		42.7680
Ethane	20.2482		22.7327		25.6269
Propane	13.0570		21.4973		16.9908
Isobutane	1.2329		2.6754		1.9046
n-Butane	3.7912		8.2273		5.6446
Neopentane	0.0062		0.0168		0.0113
Isopentane	0.5556		1.4967		0.9604
n-Pentane	0.7723		2.0805		1.3209
2,2-Dimethylbutane	0.0024		0.0076		0.0047
2,3-Dimethylbutane	0.0316		0.1017		0.0611
2-Methylpentane	0.1275		0.4101		0.2498
3-Methylpentane	0.0768		0.2472		0.1480
n-Hexane	0.1499		0.4822		0.2910
Heptanes	0.2906		1.0318		0.5638
Octanes	0.0269		0.1137		0.0635
Nonanes	0.0081		0.0376		0.0202
Decanes plus	0.0009		0.0048		0.0026
Nitrogen	5.5409		5.7953		2.8688
Carbon Dioxide	0.6200		1.0188		0.4990
Oxygen	ND		ND		ND
Hydrogen Sulfide	ND		ND		ND
Total	100.0000		100.0000		100.0000
Global Properties	Value	Units			
Gross BTU/Real CF	1491.5	BTU/SCF at 60°F and 14.73 psia			
Sat. Gross BTU/Real CF	1467.1	BTU/SCF at 60°F and 14.73 psia			
Gas Compressibility (Z)	0.9943				
Specific Gravity	0.9268	air=1			
Avg Molecular Weight	26.784	gm/mole			
Propane GPM	3.578437	gal/MCF			
Butane GPM	1.594586	gal/MCF			
Gasoline GPM	0.756282	gal/MCF			
26# Gasoline GPM	1.949002	gal/MCF			
Total GPM	12.066767	gal/MCF			
Base Mol%	99.923	%v/v			PAGE #1

Description: WHITING CDP INLET				PAGE #2
H2S Length of Stain Tube	NA	ppm		
Component	Mol%		Wt%	LV%
Benzene	0.0094		0.0273	0.0124
Toluene	0.0042		0.0145	0.0067
Ethylbenzene	0.0001		0.0004	0.0002
M&P Xylene	0.0013		0.0051	0.0023
O-Xylene	0.0002		0.0008	0.0004
2,2,4-Trimethylpentane	0.0214		0.0912	0.0507
Cyclopentane	0.0010		0.0027	0.0014
Cyclohexane	0.0185		0.0582	0.0298
Methylcyclohexane	0.0212		0.0777	0.0402
GRI GlyCalc Information				
Component	Mol%		Wt%	LV%
Carbon Dioxide	0.6200		1.0188	0.4990
Hydrogen Sulfide	ND		ND	ND
Nitrogen	5.5409		5.7953	2.8688
Methane	53.4610		32.0225	42.7680
Ethane	20.2482		22.7327	25.6269
Propane	13.0570		21.4973	16.9908
Isobutane	1.2329		2.6754	1.9046
n-Butane	3.7912		8.2273	5.6446
Isopentane	0.5618		1.5135	0.9717
n-Pentane	0.7723		2.0805	1.3209
Cyclopentane	0.0010		0.0027	0.0014
n-Hexane	0.1499		0.4822	0.2910
Cyclohexane	0.0185		0.0582	0.0298
Other Hexanes	0.2383		0.7666	0.4636
Heptanes	0.2149		0.7602	0.4226
Methylcyclohexane	0.0212		0.0777	0.0402
2,2,4 Trimethylpentane	0.0214		0.0912	0.0507
Benzene	0.0094		0.0273	0.0124
Toluene	0.0042		0.0145	0.0067
Ethylbenzene	0.0001		0.0004	0.0002
Xylenes	0.0015		0.0059	0.0027
C8+ Heavies	0.0343		0.1498	0.0834
Subtotal	100.0000		100.0000	100.0000
Oxygen	ND		ND	ND
Total	100.0000		100.0000	100.0000

ATTACHMENT D
EMISSION INVENTORY SPREADSHEETS

Facility Name:	Andeavor CDP			
Field:	Van Hook			
Nearest Wellpad:	NA			
Water/Oil Ratio:	NA	bbl/bbl		
Gas/Oil Ratio:	NA	scf/bbl		
Percent Flaring	100%			
Decline Factor:	1			
Projected Throughputs:				
	# of Wells	Oil Production (Bbl/d)	PW Production (bbl/d)	Gas Production (Mscf/d)
Existing Wells	0	0	0	
Simulated Oil/Condensate	1	20		0
Totals	1	20	0	2280

WPX Energy Williston, LLC

Input Data

GREEN = Requires input

RED = No input required. This is a calculated value.

Facility Information

Andeavor CDP

Van Hook

1

Name of the facility and the well number.

Field facility is located in.

Approximate first date of production or the date of modification of the facility.

Date application packet is due to EPA Region 8.

Production Data

BOPD pigging oil and condensate	20.00
BWPD	0.00
Mscfd	2280.000
Decline Factor	1.000
Adjusted BOPD	20
Adjusted BWPD	0
Adjusted Flared Gas (Mscfd)	2280

Description

Average daily production in barrels of oil per day (BOPD)
Average daily production in barrels of water per day (BWPD)
Average daily flared gas in Mscf per day
Expected decline factor for the first year of operation. Based on data from previously producing wells in the same field and formation.
This is the calculated BOPD expected to be produced using the above entered decline factor.
This is the calculated BWPD expected to be produced using the above entered decline factor.
This is the calculated mscfd of gas the well is expected to flare using the above entered decline factor.

Oil/Condensate Tank Data

Flash Gas Method: Process Simulator	
Process Simulator Estimated scf/bbl	41.57
Estimated Tank Vapors (scfd)	831.4
Lower Heating Value	2395.38
Molecular Weight	41.99
VOC%	77.29
VOC TPY/BOPD Emission Factor	0.649
HAP%	0.717
HAP TPY/BOPD Emission Factor	0.006
CO2%	0.23%
CH4%	1.59%
H2S weight %	0.16%
H2S mole %	0.20%
Utility Flare or Other 98% DRE Device	
Control Destruction Efficiency	98%

Description

Use the drop down menu to choose the appropriate flash gas method.
The scf/bbl from direct measurement or representative sample. Based on representative E&P Tank Emission Summary Output.
This is the estimated scfd of tank vapors based on the following: adjusted BOPD multiplied by the scf/bbl entered on Line 9.
Lower heating value (Btu/scf) of tank vapors. Based on representative E&P Tank Emission Summary Output.
Molecular weight of the tank vapors in pounds per pound-mole (lb/lb-mole). Based on representative E&P Tank Emission Summary Output.
VOC weight fraction of the tank vapor gas (C3+). Based on representative E&P Tank Emission Summary Output.
Based on representative E&P Tank Emission Summary Output. (Summary Output creates a linear relationship between TPY and BOPD)
HAP weight fraction of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
Based on representative E&P Tank Emission Summary Output. (Summary Output creates a linear relationship between TPY and BOPD)
CO2 weight fraction of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
CH4 weight fraction of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
H ₂ S weight percent of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
H ₂ S mole percent of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
Use the drop down menu to choose the appropriate emission control type.
Control efficiency of any applicable controls. This is a fixed number based on control type.

WPX Energy Williston, LLC

Input Data

GREEN = Requires input

RED = No input required. This is a calculated value.

Facility Information

Andeavor CDP

Name of the facility and the well number.

Produced Water Tank Data

Flash Gas Method: Process Simulator	
Percentage of Oil in Produced Water (%)	1.00%
Process Simulator Estimated scf/bbl	41.570
Estimated Tank Vapors (scfd)	0
Lower Heating Value	2395.38
Molecular Weight	41.99
VOC%	77.290
VOC TPY/BOPD Emission Factor	0.649
HAP%	0.717
HAP TPY/BOPD Emission Factor	0.006
CO2%	0.23%
CH4%	1.59%
H ₂ S weight %	0.16%
H ₂ S mole %	0.20%
Utility Flare or Other 98% DRE Device	
Control Destruction Efficiency	98%

Description

Use the drop down menu to choose the appropriate flash gas method.
Percentage of oil in produced water (%)
The scf/bbl from direct measurement or representative sample. Based on representative E&P Tank Emission Summary Output.
This is the estimated scfd of tank vapors based on the following: adjusted BOPD multiplied by the scf/bbl entered on Line 9.
Lower heating value (Btu/scf) of tank vapors. Based on representative E&P Tank Emission Summary Output.
Molecular weight of the tank vapors in pounds per pound-mole (lb/lb-mole). Based on representative E&P Tank Emission Summary Output.
VOC weight fraction of the tank vapor gas (C3+). Based on representative E&P Tank Emission Summary Output.
Based on representative E&P Tank Emission Summary Output. (Summary Output creates a linear relationship between TPY and BOPD)
HAP weight fraction of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
Based on representative E&P Tank Emission Summary Output. (Summary Output creates a linear relationship between TPY and BOPD)
CO2 weight fraction of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
CH4 weight fraction of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
H ₂ S weight percent of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
H ₂ S mole percent of the tank vapor gas. Based on representative E&P Tank Emission Summary Output.
Use the drop down menu to choose the appropriate emission control type.
Control efficiency of any applicable controls. This is a fixed number based on control type.

Treater Gas Data

Btu/scf	1467.10
Molecular Weight	26.78
Specific Gravity	0.93
Average Molecular Weight	26.78
VOC%	38.85%
HAP%	0.62%
CO2%	1.01%
CH4%	31.80%
H ₂ S weight %	0.00%
H ₂ S mole %	0.00%
Connected to sales line	
Control/Capture Efficiency	98%

Description

Btu/scf of wellstream gas. (From representative field gas analysis)
Average molecular weight of the wellstream gas in lb/lb-mole. (From representative field gas analysis)
If necessary to convert specific gravity to molecular weight, enter the specific gravity of the wellstream gas. (From representative field gas analysis)
(From representative field gas analyses)
VOC weight fraction of the wellstream gas (Note: Weight%, not Mole%). (From representative field gas analysis)
HAP weight fraction of the wellstream gas. (Note: Weight%, not Mole%). (From representative field gas analysis)
CO2 weight fraction of the wellstream gas. (Note: Weight%, not Mole%). (From representative field gas analysis)
CH4 weight fraction of the wellstream gas. (Note: Weight%, not Mole%). (From representative field gas analysis)
H ₂ S weight percent of the wellstream gas. (From representative field gas analysis)
H ₂ S mole percent of the wellstream gas. (From representative field gas analysis)
Use the drop down menu to choose the appropriate emission control type.
If routed to pipeline, assumed 100% capture of gas. If flared, control efficiency of any applicable controls (combustor, pit flare, utility flare, etc).

Treater Burner(s)

Total Btu/hr	0
Hours of Operation	8,760

Description

Total burner rating for the heater treater burner(s) in btu/hr. If there are multiple burners, add the total heat input together.
The burner(s) is/are assumed to operate 8,760 hours per year.

WPX Energy Williston, LLC

Input Data

GREEN = Requires input

RED = No input required. This is a calculated value.

Facility Information

Andeavor CDP

Name of the facility and the well number.

Truck Loading

Oil is hauled by truck

Submerged loading: dedicated normal service

0.6

Molecular Weight

41.99

Vapor Pressure

2.30

Temperature

50.00

Load Rate (bbl/hr)

180

Load Time (hrs)

1.00

Description

Use the drop down menu to choose the appropriate oil sales method. If oil is sold through a LACT, no input values are required in Lines 30-35.

Use the drop down list to choose the appropriate mode of operation. The saturation factor will automatically be selected based on mode of operation.

Molecular weight of tank vapors in lb/lb-mole. Assumed same molecular weight as flashing emissions from representative E&P Tanks data.

True vapor pressure of liquid loaded, pounds per square inch absolute (psia) If no site specific data is available, please refer to Table 2 on Truck Loading tab.

Temperature of bulk liquid loaded in Fahrenheit. If no site specific data is available, use an estimated average annual temperature.

Load rate of liquid loaded in barrels per hour.

The time it takes to loadout one load (hrs).

Pneumatic Pumps and Contollers (None)

Number of Pneumatic Pumps

0

Number of Pneumatic Controllers

0

Glycol Dehydrator (None)

WPX Energy Williston, LLC

Facility:
Andeavor CDP

Andeavor CDP PTE Rolling 12 Month Projection

Uncontrolled										
Criteria Pollutants										
	VOC	HAP	NOx	PM	PM10	PM2.5	CO	H ₂ S	SO ₂	HCHO
Oil/Condensate Tanks	12.99	0.12	0.00	0.00	0.00	0.00	0.00	0.03	0.00	Negligible
Produced Water Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Negligible
Casing Head Gas	11424.96	181.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Treater Burner	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	0.00	Negligible
RICE Engine	5.79	1.51	11.59	1.08	1.08	1.08	23.17	N/A	0.01	1.51
Truck Loading	0.17	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel Storage Tank	Negligible	Negligible	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Pump	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Controllers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Glycol Dehydrator	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive Leaks ^a	0.91	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Totals (TPY)	11444.81	183.27	11.59	1.08	1.08	1.08	23.17	0.03	0.01	1.54
Controlled										
Criteria Pollutants ^b										
	VOC	HAP	NOx	PM	PM10	PM2.5	CO	H ₂ S	SO ₂	HCHO
Oil/Condensate Tanks	0.26	0.00	0.02	0.00	0.00	0.00	0.11	0.00	0.05	Negligible
Produced Water Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	Negligible
Casing Head Gas	228.50	3.66	41.51	3.16	3.16	3.16	225.87	0.00	0.00	0.03
Treater Burner	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	0.00	Negligible
RICE Engine	5.79	1.51	11.59	1.08	1.08	1.08	23.17	N/A	0.01	1.51
Truck Loading	0.17	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fuel Storage Tank	0.00	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Pump	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Controllers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Glycol Dehydrator	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fugitive Leaks ^a	0.91	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Totals (TPY)	235.63	5.19	53.12	4.24	4.24	4.24	249.16	0.00	0.06	1.54

^a Emissions associated with fugitive leaks are not to be used for major source determination.

^b Emissions lead and lead compounds, fluorides, sulfuric acid mist, total reduced sulfur, and reduced sulfur compounds are assumed to be negligible for upstream oil & gas operations on the FBIR.

WPX Energy Williston, LLC

Facility:
Andeavor CDP

	Uncontrolled Greenhouse Gases ^c			Actual Greenhouse Gases ^c			
	CO ₂	CH ₄	N ₂ O	CO ₂	CH ₄	N ₂ O	
Oil Condensate Tanks	0.04	0.27	0.00	18.25	0.01	0.00	
Produced Water Tanks	0.00	0.00	0.00	0.00	0.00	0.00	
Produced Gas	297.53	9351.92	0.00	50229.53	187.04	0.92	
Treater Burner	0.00	0.00	0.00	0.00	0.00	0.00	
RICE Engine	537.22	0.01	0.00	537.22	0.01	0.00	
Truck Loading	0.00	0.00	N/A	0.00	0.00	N/A	
Fuel Storage Tank	N/A	N/A	N/A	N/A	N/A	N/A	
Pneumatic Pump	N/A	N/A	N/A	N/A	N/A	N/A	
Pneumatic Controllers	N/A	N/A	N/A	N/A	N/A	N/A	
Glycol Dehydrator	N/A	N/A	N/A	N/A	N/A	N/A	
Fugitive Leaks	0.01	0.36	N/A	0.01	0.36	N/A	
Totals (TPY)	834.80	9352.56	0.00	50785.01	187.41	0.92	
GHG Mass Emissions (tpy):			10187.36	GHG Mass Emissions (tpy):			50973.34
CO ₂ e (tpy):			197238.92	CO ₂ e (tpy):			55004.91
				Applicable to the Tailoring Rule?:			No

^c Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluorides (SF6) emissions are not created from O&G production operations.

WPX Energy Williston, LLC

RICE Input Data

Number of Engines

0

Enter the number of engines that will be installed at the production facility.

Engine #1		Description
Hours of Operation	8760	Engine is assumed to operate 8,760 hours per year.
Maximum HP Rating	600	
NOx g/hp-hr	2.00E+00	
CO g/hp-hr	4.00E+00	
SO2 g/hp-hr	2.27E-03	
PM g/hp-hr	1.86E-01	
VOC g/hp-hr	1.00E+00	
HAP g/hp-hr	2.61E-01	
CO2 g/hp-hr	9.27E+01	
CH4 g/hp-hr	1.75E-03	
N2O g/hp-hr	1.75E-04	

Engine #2		Description
Hours of Operation	8760	Engine is assumed to operate 8,760 hours per year.
Maximum HP Rating	0	
NOx g/hp-hr	3.25E+00	
CO g/hp-hr	3.73E+00	
SO2 g/hp-hr	1.12E+00	
PM g/hp-hr	2.98E-01	
VOC g/hp-hr	2.59E-01	
HAP g/hp-hr	2.76E-01	
CO2 g/hp-hr	1.31E+02	
CH4 g/hp-hr	5.25E-03	
N2O g/hp-hr	1.05E-03	

WPX Energy Williston, LLC

RICE Input Data

Engine #3		Description
Hours of Operation	8760	Engine is assumed to operate 8,760 hours per year.
Maximum HP Rating	0	
NOx g/hp-hr	2.76E+00	
CO g/hp-hr	2.61E+00	
SO2 g/hp-hr	1.12E+00	
PM g/hp-hr	1.49E-01	
VOC g/hp-hr	2.20E-01	
HAP g/hp-hr	2.76E-01	
CO2 g/hp-hr	1.31E+02	
CH4 g/hp-hr	5.25E-03	
N2O g/hp-hr	1.05E-03	

Engine #4		Description
Hours of Operation	8760	Engine is assumed to operate 8,760 hours per year.
Maximum HP Rating	0	
NOx g/hp-hr	2.76E+00	
CO g/hp-hr	2.61E+00	
SO2 g/hp-hr	1.12E+00	
PM g/hp-hr	1.49E-01	
VOC g/hp-hr	2.20E-01	
HAP g/hp-hr	2.76E-01	
CO2 g/hp-hr	1.31E+02	
CH4 g/hp-hr	5.25E-03	
N2O g/hp-hr	1.05E-03	

WPX Energy Williston, LLC

Andeavor CDP

Oil Tanks

Oil Production bopd

Flare Gas Volume scfh

Lower Heating Value Btu/scf

Molecular Weight lb/lb-mole

VOC wt Fraction

VOC Emission Factor tpy/bo

HAPs:

Benzene wt Fraction

Toluene wt Fraction

E-Benzene wt Fraction

Xylene wt Fraction

n-Hexane wt Fraction

2,2,4-Trimethylpentane

wt Fraction

HAP Emission Factor tpy/bopd

CO2 wt Fraction

CH4 wt Fraction

H2S wt Fraction

As per NSPS Subpart OOOO, Controlled and Uncontrolled emissions are calculated based on a

destruction efficiency of the VOC gas.

WPX Energy Williston, LLC

Andeavor CDP

Oil Tanks

CRITERIA POLLUTANT EMISSIONS^a

Uncontrolled VOCs (PTE):

Using E&P Tanks Run:	0.649	TPY VOC/BO	x	20	BO	x	DRE	0%	=	12.99	TPY
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Controlled VOCs (Allowable):	
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Using E&P Tanks Run:	0.649	TPY VOC/BO	x	20	BO	x	DRE	98%	=	0.26	TPY
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Uncontrolled HAPs (PTE):

Using E&P Tanks Run:										DRE		TPY				
Benzene	35	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.02%	x	0%	=	0.0007	lb/hr	=	0.0031
E-Benzene	35	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.00%	x	0%	=	0.0001	lb/hr	=	0.0003
Toluene	35	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.01%	x	0%	=	0.0005	lb/hr	=	0.0022
n-Hexane	35	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.61%	x	0%	=	0.0236	lb/hr	=	0.1033
Xylene	35	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.01%	x	0%	=	0.0004	lb/hr	=	0.0018
2,2,4-Trimethylpentane	35	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.06%	x	0%	=	0.0023	lb/hr	=	0.0099
Uncontrolled TOTAL HAPS (TPY)														=	0.1206	

[illegible][illegible]

WPX Energy Williston, LLC

Andeavor CDP

Oil Tanks

NOx Created by Combustion (PTE)

$$\begin{aligned} \text{NOx: } 35 \text{ scf/hr} &\times 2,395 \text{ Btu/scf} \times 1 \text{ MMBtu}/1,000,000 \text{ Btu} \times 0.068 \text{ lb/MMBtu} = 0.01 \text{ lb/hr} \\ 0.01 \text{ lb/hr} &\times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} = 0.02 \text{ TPY} \end{aligned}$$

Uncontrolled H2S: (PTE)

$$\begin{aligned} \text{H2S: } 35 \text{ scf} &\times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 0.16\% \text{ wt} \times 0\% \text{ DRE} = 0.01 \text{ lb/hr} \\ 0.01 \text{ lb/hr} &\times 8760 \text{ hrs / 1 yr} \times 1 \text{ ton}/2000 \text{ lb} = 0.03 \text{ TPY} \end{aligned}$$

Controlled H2S: (Allowable)

$$\begin{aligned} \text{H2S } 35 \text{ scf} &\times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 0.16\% \text{ wt\%} \times 98\% \text{ DRE} = 0.00 \text{ lb/hr} \\ 0.00 \text{ lb/hr} &\times 8760 \text{ hrs / 1 yr} \times 1 \text{ ton}/2000 \text{ lb} = 0.00 \text{ TPY} \end{aligned}$$

SO2 Created by Combustion: (PTE)

$$\begin{aligned} \text{SO2 } 0.01 \text{ lb H2S} &\times 1/34.08 \text{ lb H2S/lb-mole} \times 64.07 \text{ lb SO2/lb-mole} \times 98.00\% \text{ DRE} = 0.01 \text{ lb/hr} \\ 0.01 \text{ lb/hr} &\times 8760 \text{ hrs / 1 yr} \times 1 \text{ ton}/2000 \text{ lb} = 0.05 \text{ TPY} \end{aligned}$$

PM Created by Combustion (PTE)

$$\begin{aligned} \text{PM: } 35 \text{ scf/hr} &\times 7.6 \text{ lb}/1,000,000 \text{ scf} = 0.00 \text{ lb/hr} \\ 0.00 \text{ lb/hr} &\times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} = 0.00 \text{ TPY} \end{aligned}$$

CO Created by Combustion (PTE)

$$\begin{aligned} \text{CO: } 35 \text{ scf/hr} &\times 2,395 \text{ Btu/scf} \times 1 \text{ MMBtu}/1,000,000 \text{ Btu} \times 0.310 \text{ lb/MMBtu} = 0.03 \text{ lb/hr} \\ 0.03 \text{ lb/hr} &\times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} = 0.11 \text{ TPY} \end{aligned}$$

^aNOx and CO emission factors are from AP-42 Table 13.5-1 and Table 13.5-2

WPX Energy Williston, LLC

Andeavor CDP

Oil Tanks

(Emission Factors for Flare Operations).

WPX Energy Williston, LLC

Andeavor CDP

Oil Tanks

REGULATED GREENHOUSE GAS EMISSIONS^b

Uncombusted CO2: (PTE)

$$\text{CO2: } 35 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 0.23\% \text{ wt} \times 0\% \text{ DRE} = 0.01 \text{ lb/hr}$$
$$0.01 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.04 \text{ TPY}$$

CO2 Created by Combustion (PTE)

$$\text{CO2: } 35 \text{ scf/hr} \times 120,000.0 \text{ lb/1,000,000 scf} = 4.16 \text{ lb/hr}$$
$$4.16 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 18.21 \text{ TPY}$$

Uncontrolled CH4: (PTE)

$$\text{CH4: } 35 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 1.59\% \text{ wt} \times 0\% \text{ DRE} = 0.06 \text{ lb/hr}$$
$$0.06 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.27 \text{ TPY}$$

Controlled CH4: (Allowable)

$$\text{CH4: } 35 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 1.59\% \text{ wt} \times 98\% \text{ DRE} = 0.00 \text{ lb/hr}$$
$$0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.01 \text{ TPY}$$

N2O Created by Combustion: (PTE)

$$\text{CH4: } 35 \text{ scf/hr} \times 2.2 \text{ lb/1,000,000 scf} = 0.00 \text{ lb/hr}$$
$$0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY}$$

^bCO2, PM, and N2O emission factors are from AP-42 Table 1.4-2 (Emission Factors for Natural Gas Combustion).

WPX Energy Williston, LLC

Andeavor CDP

Produced Water Tanks

Oil Production: 0.0 bopd

Flare Gas Volume: 0.0 scfh

Lower Heating Value: 2395.38 Btu/scf

Molecular Weight: 41.99 lb/lb-mole

VOC wt Fraction: 77.29%

VOC Emission Factor: 0.649 tpy/bo

HAPs:

Benzene wt Fraction: 0.0186%

Toluene wt Fraction: 0.0132%

E-Benzene wt Fraction: 0.0018%

Xylene wt Fraction: 0.0109%

n-Hexane wt Fraction: 0.6143%

2,2,4-Trimethylpentane
wt Fraction: 0.0587%

HAP Emission Factor: 0.006 tpy/bopd

CO2 wt Fraction: 0.23%

CH4 wt Fraction: 1.59%

H2S wt Fraction: 0.16%

Note: This oil production is based on the oil content (1%) in the produced water tanks and the produced water throughput

As per NSPS Subpart OOOO, Controlled and Uncontrolled emissions are calculated based on a

98% destruction efficiency of the VOC gas.

WPX Energy Williston, LLC

Andeavor CDP

Produced Water Tanks

CRITERIA POLLUTANT EMISSIONS^a

Uncontrolled VOCs (PTE):

Using E&P Tanks Run:	0.649	TPY VOC/BO	x	0.0	BO	x	DRE 0%	=	0.00	TPY
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Controlled VOCs (Allowable):

Using E&P Tanks Run:	0.649	TPY VOC/BO	x	0.0	BO	x	DRE 98%	=	0.00	TPY
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Uncontrolled HAPs (PTE):

Using E&P Tanks Run:										DRE		TPY				
Benzene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.02%	x	0%	=	0.0000	lb/hr	=	0.0000
E-Benzene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.00%	x	0%	=	0.0000	lb/hr	=	0.0000
Toluene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.01%	x	0%	=	0.0000	lb/hr	=	0.0000
n-Hexane	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.61%	x	0%	=	0.0000	lb/hr	=	0.0000
Xylene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.01%	x	0%	=	0.0000	lb/hr	=	0.0000
2,2,4-Trimethylpentane	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.06%	x	0%	=	0.0000	lb/hr	=	0.0000
												Uncontrolled TOTAL HAPS (TPY)		=	0.0000	

Controlled HAPs (Allowable):						

	Benzene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.02%	x	98%	=	0.0000	lb/hr	=	0.0000
	E-Benzene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.00%	x	98%	=	0.0000	lb/hr	=	0.0000
	Toluene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.01%	x	98%	=	0.0000	lb/hr	=	0.0000
	n-Hexane	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.61%	x	98%	=	0.0000	lb/hr	=	0.0000
	Xylene	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.01%	x	98%	=	0.0000	lb/hr	=	0.0000
2,2,4-Trimethylpentane	0	scf/hr	x	1/379 scf/lb-mole	x	41.99	lb/lb-mol	x	0.06%	x	98%	=	0.0000	lb/hr	=	0.0000	
													Controlled TOTAL HAPS (TPY)		=	0.0000	

WPX Energy Williston, LLC

Andeavor CDP

Produced Water Tanks

NOx Created by Combustion (PTE)

$$\begin{aligned} \text{NOx: } & 0 \text{ scf/hr} \times 2,395 \text{ Btu/scf} \times 1 \text{ MMBtu/1,000,000 Btu} \times 0.068 \text{ lb/MMBtu} = 0.00 \text{ lb/hr} \\ & 0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY} \end{aligned}$$

Uncontrolled H2S: (PTE)

$$\begin{aligned} \text{H2S: } & 0 \text{ scf} \times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 0.16\% \text{ wt} \times 0\% \text{ DRE} = 0.00 \text{ lb/hr} \\ & 0.00 \text{ lb/hr} \times 8760 \text{ hrs / 1 yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY} \end{aligned}$$

Controlled H2S: (Allowable)

$$\begin{aligned} \text{H2S } & 0 \text{ scf} \times 1/379 \text{ scf/lb-mole} \times 41.99 \text{ lb/lb-mole} \times 0.16\% \text{ wt\%} \times 98\% \text{ DRE} = 0.00 \text{ lb/hr} \\ & 0.00 \text{ lb/hr} \times 8760 \text{ hrs / 1 yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY} \end{aligned}$$

SO2 Created by Combustion: (PTE)

$$\begin{aligned} \text{SO2 } & 0.0 \text{ lb H2S} \times 1/34.08 \text{ lb H2S/lb-mole} \times 64.07 \text{ lb SO2/lb-mole} \times 98.00\% \text{ DRE} = 0.00 \text{ lb/hr} \\ & 0.00 \text{ lb/hr} \times 8760 \text{ hrs / 1 yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY} \end{aligned}$$

PM Created by Combustion (PTE)

$$\begin{aligned} \text{PM: } & 0 \text{ scf/hr} \times 7.6 \text{ lb/1,000,000 scf} = 0.00 \text{ lb/hr} \\ & 0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY} \end{aligned}$$

CO Created by Combustion (PTE)

$$\begin{aligned} \text{CO: } & 0 \text{ scf/hr} \times 2,395 \text{ Btu/scf} \times 1 \text{ MMBtu/1,000,000 Btu} \times 0.310 \text{ lb/MMBtu} = 0.00 \text{ lb/hr} \\ & 0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY} \end{aligned}$$

^aNOx and CO emission factors are from AP-42 Table 13.5-1 and Table 13.5-2 (Emission Factors for Flare Operations).

WPX Energy Williston, LLC

Andeavor CDP

Produced Water Tanks

REGULATED GREENHOUSE GAS EMISSIONS^b

Uncombusted CO₂: (PTE)

$$\begin{aligned} \text{CO}_2: & \text{0 scf/hr} \times \text{1/379 scf/lb-mole} \times \text{41.99 lb/lb-mole} \times \text{0.23\% wt} \times \text{0\% DRE} = \text{0.00 lb/hr} \\ & \text{0.00 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{0.00 TPY} \end{aligned}$$

CO₂ Created by Combustion (PTE)

$$\begin{aligned} \text{CO}_2: & \text{0 scf/hr} \times \text{120,000.0 lb/1,000,000 scf} = \text{0.00 lb/hr} \\ & \text{0.00 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{0.00 TPY} \end{aligned}$$

Uncontrolled CH₄: (PTE)

$$\begin{aligned} \text{CH}_4: & \text{0 scf/hr} \times \text{1/379 scf/lb-mole} \times \text{41.99 lb/lb-mole} \times \text{1.59\% wt} \times \text{0\% DRE} = \text{0.00 lb/hr} \\ & \text{0.00 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{0.00 TPY} \end{aligned}$$

Controlled CH₄: (Allowable)

$$\begin{aligned} \text{CH}_4: & \text{0 scf/hr} \times \text{1/379 scf/lb-mole} \times \text{41.99 lb/lb-mole} \times \text{1.59\% wt} \times \text{98\% DRE} = \text{0.00 lb/hr} \\ & \text{0.00 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{0.00 TPY} \end{aligned}$$

N₂O Created by Combustion: (PTE)

$$\begin{aligned} \text{CH}_4: & \text{0 scf/hr} \times \text{2.2 lb/1,000,000 scf} = \text{0.00 lb/hr} \\ & \text{0.00 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{0.00 TPY} \end{aligned}$$

^bCO₂, PM, and N₂O emission factors are from AP-42 Table 1.4-2 (Emission Factors for Natural Gas Combustion).

WPX Energy Williston, LLC

Andeavor CDP

Casing Head Gas

Flare Gas Volume	95,000	scfh
Lower Heating Value	1467.10	Btu/scf
Avg. Molecular Weight	26.78	lb/lb-mole
VOC wt fraction	38.85%	
HAP wt fraction	0.62%	
Benzene wt fraction	0.03%	
E-Benzene wt fraction	0.00%	
Toluene wt fraction	0.01%	
n-Hexane wt fraction	0.48%	
Xylene wt fraction	0.01%	
2,2,4-Trimethylpentane wt fraction	0.09%	
CO2 wt fraction	1.01%	
CH4 wt fraction	31.80%	
H2S wt fraction	0.00%	
Hours of Flaring for PTE:	8760	hours/yr
Control Efficiency	98%	DRE

*Industry considers the routing of all produced gas to a backup flare standard practice for safety purposes; therefore, being inherent to the process; however, the Casing Head Gas emissions are estimated as if unsold gas is vented to the atmosphere for purposes of calculating uncontrolled PTE.

WPX Energy Williston, LLC

Andeavor CDP

Casing Head Gas

CRITERIA POLLUTANT EMISSIONS²

Uncontrolled VOCs (PTE) :

VOC:	95,000	scf/hr	x	1/379	scf/lb-mole	x	26.784	lb/lb-mole	x	wt%	38.85%	x	Control %	0%	=	2608.44	lb/hr
							2608.44	lb/hr	x		8760	hr/yr	x	1 ton/2000 lb	=	11424.96	TPY

Controlled VOCs (Allowable):

[illegible]

Uncontrolled HAPs (PTE):

Using E&P Tanks Run:

Links Run:						wt%		Control %		TPY
Benzene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.03%	x	0%	= 1.83 lb/hr = 8.01
E-Benzene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.00%	x	0%	= 0.03 lb/hr = 0.12
Toluene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.01%	x	0%	= 0.96 lb/hr = 4.22
n-Hexane	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.48%	x	0%	= 32.16 lb/hr = 140.86
Xylene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.01%	x	0%	= 0.40 lb/hr = 1.74
ethylpentane	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.09%	x	0%	= 6.09 lb/hr = 26.66
ormaldehyde	95,000 scf/hr		7.50E-02 lb/MMscf							= 0.01 lb/hr = 0.03
			41.47 lb/hr	x	8760 hr/yr	x	1 ton/2000 lb	=	181.63	TPY

Controlled HAPs (Allowable):

Using E&P Tanks Run:

Anks Run:						wt%		Control %			TPY		
Benzene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.03%	x	98%	=	0.04 lb/hr	=	0.16
E-Benzene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.00%	x	98%	=	0.00 lb/hr	=	0.00
Toluene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.01%	x	98%	=	0.02 lb/hr	=	0.08
n-Hexane	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.48%	x	98%	=	0.64 lb/hr	=	2.82
Xylene	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.01%	x	98%	=	0.01 lb/hr	=	0.03
ethylpentane	95,000 scf/hr	x	1/379 scf/lb-mole	x	26.784 lb/lb-mol	x	0.09%	x	98%	=	0.12 lb/hr	=	0.53
ormaldehyde	95,000 scf/hr	x	7.50E-02 lb/MMscf	x	1000000 scf/MMscf					=	0.01 lb/hr	=	0.03
			0.84 lb/hr	x	8760 hr/yr	x	1 ton/2000 lb			=	3.66	TPY	

WPX Energy Williston, LLC

Andeavor CDP

Casing Head Gas

Uncontrolled NOx (PTE):

$$\begin{aligned} \text{NOx: } 95,000 \text{ scf/hr} \times 1,467 \text{ Btu/scf} \times 1 \text{ Mmbtu}/1,000,000 \text{ Btu} \times 0.000 \text{ lb/MMBtu} &= 0.00 \text{ lb/hr} \\ 0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} &= 0.00 \text{ TPY} \end{aligned}$$

NOx Created by Combustion (PTE):

$$\begin{aligned} \text{NOx: } 95,000 \text{ scf/hr} \times 1,467 \text{ Btu/scf} \times 1 \text{ Mmbtu}/1,000,000 \text{ Btu} \times 0.068 \text{ lb/MMBtu} &= 9.48 \text{ lb/hr} \\ 9.48 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} &= 41.51 \text{ TPY} \end{aligned}$$

Uncontrolled H2S (PTE):

$$\begin{aligned} \text{H}_2\text{S: } 95,000 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 26.784 \text{ lb/lb-mole} \times 0.00\% \text{ wt\%} \times 0\% \text{ Control \%} &= 0.00 \text{ lb/hr} \\ 0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} &= 0.00 \text{ TPY} \end{aligned}$$

Controlled H2S (Allowable):

$$\begin{aligned} \text{H}_2\text{S: } 95,000 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 26.784 \text{ lb/lb-mole} \times 0.000\% \text{ wt\%} \times 98\% \text{ Control \%} &= 0.00 \text{ lb/hr} \\ 0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton}/2000 \text{ lb} &= 0.00 \text{ TPY} \end{aligned}$$

WPX Energy Williston, LLC

Andeavor CDP

Casing Head Gas

Uncontrolled SO₂ (PTE):

$$\text{SO}_2: 95,000 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 26.784 \text{ lb/lb-mole} \times 0.00\% \times 0\% = 0.00 \text{ lb/hr}$$
$$0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY}$$

SO₂ Created by Combustion (PTE):

$$\text{SO}_2: 95,000 \text{ scf/hr} \times 1/379 \text{ scf/lb-mole} \times 0.00\% \times 1 \text{ lb-mole SO}_2/\text{lb-mole H}_2\text{S} \times 64.066 \text{ lb/lb-mole} = 0.00 \text{ lb/hr}$$
$$0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY}$$

Uncontrolled CO (PTE):

$$\text{CO}: 95,000 \text{ scf/hr} \times 1,467 \text{ Btu/scf} \times 1 \text{ Mmbtu/1,000,000 Btu} \times 0.000 \text{ lb/MMBtu} = 0.00 \text{ lb/hr}$$
$$0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY}$$

CO Created by Combustion (PTE):

$$\text{CO}: 95,000 \text{ scf/hr} \times 1,467 \text{ Btu/scf} \times 1 \text{ Mmbtu/1,000,000 Btu} \times 0.370 \text{ lb/MMBtu} = 51.57 \text{ lb/hr}$$
$$51.57 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 225.87 \text{ TPY}$$

Uncontrolled PM (PTE):

$$\text{PM}: 95,000 \text{ scf/hr} \times 0.0 \text{ lb/1,000,000 scf} = 0.00 \text{ lb/hr}$$
$$0.00 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 0.00 \text{ TPY}$$

PM Created by Combustion (PTE):

$$\text{PM}: 95,000 \text{ scf/hr} \times 7.6 \text{ lb/1,000,000 scf} = 0.72 \text{ lb/hr}$$
$$0.72 \text{ lb/hr} \times 8760 \text{ hr/yr} \times 1 \text{ ton/2000 lb} = 3.16 \text{ TPY}$$

^aNO_x, SO₂, PM, & CO emission factors are from AP-42 Table 13.5-1, Table 13.5-2, and Table 1.4-2

WPX Energy Williston, LLC

Andeavor CDP

Casing Head Gas

(Emission Factors for Flare Operations and Natural Gas Combustion).

WPX Energy Williston, LLC

Andeavor CDP

Casing Head Gas

REGULATED GREENHOUSE GAS EMISSIONS^b

CO₂ (PTE):

CO₂ Entrained in the Produced Gas:

$$\begin{aligned} \text{CO}_2: & \text{95,000 scf/hr} \times \text{1/379 scf/lb-mole} \times \text{26.784 lb/lb-mole} \times \text{1.01\% wt\%} \times \text{0\% Control \%} = \text{67.93 lb/hr} \\ & \text{67.93 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{297.53 TPY} \end{aligned}$$

CO₂ Created by Combustion:

$$\begin{aligned} \text{CO}_2: & \text{95,000 scf/hr} \times \text{120,000.0 lb/1,000,000 scf} = \text{11400.00 lb/hr} \\ & \text{11400.00 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{49932.00 TPY} \\ \text{Total CO}_2 \text{ Emitted (Allowable):} & \text{50229.53 TPY} \end{aligned}$$

Uncontrolled CH₄ (PTE):

$$\begin{aligned} \text{CH}_4: & \text{95,000 scf/hr} \times \text{1/379 scf/lb-mole} \times \text{26.784 lb/lb-mole} \times \text{31.80\% wt\%} \times \text{0\% Control \%} = \text{2135.14 lb/hr} \\ & \text{2135.14 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{9351.92 TPY} \end{aligned}$$

Controlled CH₄ (PTE):

$$\begin{aligned} \text{CH}_4: & \text{95,000 scf/hr} \times \text{1/379 scf/lb-mole} \times \text{26.784 lb/lb-mole} \times \text{31.80\% wt\%} \times \text{98\% Control \%} = \text{42.70 lb/hr} \\ & \text{42.70 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{187.04 TPY} \end{aligned}$$

N₂O Created by Combustion (PTE):

$$\begin{aligned} \text{N}_2\text{O}: & \text{95,000 scf/hr} \times \text{2.2 lb/1,000,000 scf} = \text{2.09E-01 lb/hr} \\ & \text{2.09E-01 lb/hr} \times \text{8760 hr/yr} \times \text{1 ton/2000 lb} = \text{9.15E-01 TPY} \end{aligned}$$

^bCO₂ and N₂O emission factors are from AP-42 Table 1.4-2 (Emission Factors for Natural Gas Combustion).

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Andeavor CDP

Heater Treater Burner^a

Burner Rating Btu/hr This burner rating reflects the combined size of all of the proposed heater treater burners at the facility.

NOx: lb/MMBtu x MMBtu/hr = lb/hr
 lb/hr x hr/yr x = TPY

CO: lb/MMBtu x MMBtu/hr = lb/hr
 lb/hr x hr/yr x = TPY

SO₂: lb/MMBtu x MMBtu/hr = lb/hr
 lb/hr x hr/yr x = TPY

PM: lb/MMBtu x MMBtu/hr = lb/hr
 lb/hr x hr/yr x = TPY

VOC: lb/MMBtu x MMBtu/hr = lb/hr
 lb/hr x hr/yr x = TPY

WPX Energy Williston, LLC

Andeavor CDP

Heater Treater Burner^a

$$\begin{array}{l} \text{HAP: } 0.002 \text{ lb/MMBtu} \times 0.00 \text{ MMBtu/hr} = 0.000 \text{ lb/hr} \\ 0.00\text{E}+00 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton / 2000 lb} = 0.000 \text{ TPY} \end{array}$$

$$\begin{array}{l} \text{CO2 } 116.997 \text{ lb/MMBtu} \times 0.00 \text{ MMBtu/hr} = 0.000 \text{ lb/hr} \\ 0.00\text{E}+00 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton / 2000 lb} = 0.000 \text{ TPY} \end{array}$$

$$\begin{array}{l} \text{CH4: } 0.002 \text{ lb/MMBtu} \times 0.00 \text{ MMBtu/hr} = 0.000 \text{ lb/hr} \\ 0.00\text{E}+00 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton / 2000 lb} = 0.000 \text{ TPY} \end{array}$$

$$\begin{array}{l} \text{N2O: } 0.000 \text{ lb/MMBtu} \times 0.00 \text{ MMBtu/hr} = 0.000 \text{ lb/hr} \\ 0.00\text{E}+00 \text{ lb/hr} \times 8,760 \text{ hr/yr} \times 1 \text{ ton / 2000 lb} = 0.000 \text{ TPY} \end{array}$$

^aNOx, CO, CO2, & VOC Emission Factors are from AP-42 Table 1.4-1 and 1.4-2 (Emission Factors for Nitrogen Oxides (N2O) and Methane come from Table C-1 of Subpart W).

0.00 NOx TPY

0.00 CO TPY

0.00 SO2 TPY

0.00 PM TPY

0.00 VOC TPY

0.00 HAP TPY

0.00 CO2 TPY

0.00 CH4 TPY

0.00 N2O TPY

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Andeavor CDP

Truck Loadout Emission Calculation

	Saturation Factor (S)	Vapor Pressure (P)	Molecular Weight (MW)	Temp + 460	Load Loss lb/1000 gal
12.46	x 0.60	x 2.30	x 41.99	/ 510.00	= 1.42
LL lb/1,000 gal	Truck Load Rate bbl/hr	Load Time hrs	gal/bbl	Total Gas Emissions lb/hr	
1.42	x 180.00	/ 1.00	x 42.00	= 10.74	

LL lb/1,000 gal	Annual bbl/yr	gal/bbl	lb/ton	Emissions TPY	Uncontrolled C3+ VOC tpy
1.42	x 7300.00	x 42.00	/ 2000.00	= 0.22	0.1682
VOC Emissions TPY					
Uncontrolled	Control %				
0.17	0%	1.00	0.17		

LL lb/1,000 gal	Annual bbl/yr	gal/bbl	lb/ton	Emissions TPY	Uncontrolled HAPs tpy
1.42	x 7300.00	x 42.00	/ 2000.00	= 0.22	0.00
HAPs Emissions TPY					
Uncontrolled	Control %				
0.00	0%	1.00	0.00		

LL lb/1,000 gal	Annual bbl/yr	gal/bbl	lb/ton	Emissions TPY	Uncontrolled CO2 tpy
1.42	x 7300.00	x 42.00	/ 2000.00	= 0.22	0.00
CO2 Emissions TPY					
Uncontrolled	Control %				
0.00	0%	1.00	0.00		

LL lb/1,000 gal	Annual bbl/yr	gal/bbl	lb/ton	Emissions TPY	Uncontrolled CH4 tpy
1.42	x 7300.00	x 42.00	/ 2000.00	= 0.22	0.00
CH4 Emissions TPY					
Uncontrolled	Control %				
0.00	0%	1.00	0.00		

WPX Energy Williston, LLC

Andeavor CDP

Reciprocating Engine Emissions

ENGINE #1

	600	MAX HP		0% 100.0%	NOx DRE		0% 100.00%	CO DRE		0% 100.0%	VOC DRE		0% 100.00%	SO2 DRE		0% 100.00%	HAP DRE		0% 100.00%	PM DRE
NOx:	2.00E+00	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		2.65E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		1.16E+01 NOx TPY
CO:	4.00E+00	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		5.29E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		2.32E+01 CO TPY
SO2:	2.27E-03	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		3.00E-03 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		1.31E-02 SO2 TPY
PM:	1.86E-01	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		2.46E-01 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		1.08E+00 PM TPY
VOC:	1.00E+00	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		1.32E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		5.79E+00 VOC TPY
HAP:	2.61E-01	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		3.45E-01 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		1.51E+00 HCHO TPY
CO2:	9.27E+01	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		1.23E+02 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		5.37E+02 CO2
CH4:	1.75E-03	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		2.31E-03 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		1.01E-02 CH4
N2O:	1.75E-04	g/HP-HR	x		600 HP	x		1 lb / 453.6 grams	=		2.31E-04 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		1.01E-03 N2O

ENGINE #2

	0	MAX HP		0% 100.0%	NOx DRE		0% 100.00%	CO DRE		0% 100.0%	VOC DRE		0% 100.00%	SO2 DRE		0% 100.00%	HAP DRE		0% 100.00%	PM DRE
NOx:	3.25E+00	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	x		0.00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 NOx TPY
CO:	3.73E+00	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	x		0.00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 CO TPY
SO2:	1.12E+00	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	=		0.00E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 SO2 TPY
PM:	2.98E-01	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	=		0.00E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 PM TPY
VOC:	2.59E-01	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	x		0.00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 VOC TPY
HAP:	3.60E-03	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	=		0.00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 HAP TPY
CO2:	1.58E-03	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	=		0.00E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 CO2 TPY
CH4:	0.00E+00	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	=		0.00E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 CH4 TPY
N2O:	1.10E-03	g/HP-HR	x		0 HP	x		1 lb / 453.6 grams	=		0.00E+00 lb/hr	x		8760 hr/yr	x		1 ton / 2000lb	=		0.00E+00 N2O TPY

WPX Energy Williston, LLC

Andeavor CDP

Reciprocating Engine Emissions

ENGINE #3

	0	MAX HP	0%	NOx DRE	27%	CO DRE	1%	VOC DRE	0%	SO2 DRE	0%	HAP DRE	0%	PM DRE
			100.0%		73.01%		99.5%		100.00%		100.00%		100.00%	
NOx:	2.76E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	x	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 NOx TPY
CO:	2.61E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	x	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 CO TPY
SO2:	1.12E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 SO2 TPY
PM:	1.49E-01	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 PM TPY
VOC:	2.20E-01	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	x	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 VOC TPY
HAP:	3.60E-03	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 HAP TPY
CO2:	1.58E-03	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 CO2 TPY
CH4:	0.00E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 CH4 TPY
N2O:	1.10E-03	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 N2O TPY

ENGINE #4

	0	MAX HP	0%	NOx DRE	0%	CO DRE	27%	VOC DRE	0%	SO2 DRE	0%	HAP DRE	0%	PM DRE
			100.0%		100.00%		73.0%		100.00%		100.00%		100.00%	
NOx:	2.76E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	x	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 NOx TPY
CO:	2.61E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	x	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 CO TPY
SO2:	1.12E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 SO2 TPY
PM:	1.49E-01	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 PM TPY
VOC:	2.20E-01	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	x	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 VOC TPY
HAP:	3.60E-03	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 HAP TPY
CO2:	1.58E-03	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 CO2 TPY
CH4:	0.00E+00	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 CH4 TPY
N2O:	1.10E-03	g/HP-HR	x	0 HP	x	1 lb / 453.6 grams	=	0.00E+00 lb/hr	x	8760 hr/yr	x	1 ton / 2000lb	=	0.00E+00 N2O TPY

TOTALS

1.16E+01 NOx TPY

2.32E+01 CO TPY

1.31E-02 SO2 TPY

1.08E+00 PM TPY

5.79E+00 VOC TPY

1.51E+00 HAP TPY

5.37E+02 CO2 TPY

1.01E-02 CH4 TPY

1.01E-03 N2O TPY

WPX Energy Williston, LLC

Andeavor CDP

Emissions from Pneumatic Controllers

Emissions (lb/hr) = PSCR (scf/hr) x (1/379 scf/lb-mole) x (VOC wt. Fraction)

Emissions (TPY) = (lb/hr VOC) x (8760 hr/yr) x (1 ton/2000)

Where:

PSCR = Pneumatic Source Consumption Rate (scf/min), as per manufacturers literature

Gas MW = Supply Gas Average Molecular Weight (lb/lb-mole)

$$\frac{0 \text{ scf/hr}}{1} \times \frac{60 \text{ min/hr}}{1} \times \frac{1/379 \text{ scf/lb-mole}}{1} \times \frac{26.78 \text{ Supply Gas MW}}{1} \times \frac{38.85\% \text{ VOC wt fraction}}{1} = 0.00 \text{ lb/hr VOC}$$

$$\frac{\text{lbs/hr}}{\text{Hours (winter months)}} \times \text{2000 lbs/ton} = \text{0.00 TPY VOC}$$

$$\frac{0 \text{ scf/hr}}{60 \text{ min/hr}} \times \frac{1}{1379 \text{ scf/lb-mole}} \times \frac{26.78 \text{ Supply Gas MW}}{1} \times \frac{0.62\% \text{ HAP wt fraction}}{1} = 0.00 \text{ lb/hr HAP}$$

lbs/hr		Hours			
		(winter months)			
0.00	x	0	x	2000 lbs/ton	= 0.00 TPY HAP

WPX Energy Williston, LLC

Andeavor CDP

Emissions from Pneumatic Pumps

Emissions (lb/hr) = PSCR (scf/min) x (60 min/1hr) x (1/379 scf/lb-mole) x (VOC wt. Fraction)

Emissions (TPY) = (lb/hr VOC) x (8760 hr/yr) x (1 ton/2000)

Where:

PSCR = Pneumatic Source Consumption Rate (scf/min), as per manufacturers literature

Gas MW = Supply Gas Average Molecular Weight (lb/lb-mole)

$$0 \text{ scfm/min} \times 60 \text{ min/1 hr} \times 1/379 \text{ scf/lb-mole} \times \frac{\text{Supply Gas MW}}{26.78} \times \frac{\text{VOC wt fraction}}{38.85\%} = 0.00 \text{ lb/hr VOC Uncontrolled}$$

$$0.00 \text{ lbs/hr} \times \frac{\text{Hours (winter months)}}{0} \times 2000 \text{ lbs/ton} = 0.00 \text{ TPY VOC Uncontrolled}$$

$$0 \text{ scfm/min} \times 60 \text{ min/1 hr} \times 1/379 \text{ scf/lb-mole} \times \frac{\text{Supply Gas MW}}{26.78} \times \frac{\text{HAP wt fraction}}{0.62\%} = 0.00 \text{ lb/hr HAP Uncontrolled}$$

$$0.00 \text{ lbs/hr} \times \frac{\text{Hours (winter months)}}{0} \times 2000 \text{ lbs/ton} = 0.00 \text{ TPY HAP Uncontrolled}$$

Control Efficiency **100%**

Number of Pumps **0**

Total Controlled Emissions **0.00 TPY VOC**

Total Controlled Emissions **0.00 TPY HAP**

WPX Energy Williston, LLC

Andeavor CDP

Fugitive Emissions

VOC Fugitive Calculations:	Emission Factor ^a (lbs/hr/ comp.)	Component Number ^b	VOC Weight Fraction ^{c,d}	HAP weight Fraction ^{c,d}	VOC Emission Rate, (lbs/hr)	VOC Emission Rate, (tons/yr)	HAPs Emissions Rate, (lbs/hr)	HAPs Emissions Rate, (tons/yr)
Gas Valve VOC's:	9.90E-03	19	38.85%	0.62%	7.31E-02	3.20E-01	1.16E-03	5.09E-03
Light Oil Valve VOC's:	5.50E-03	19	77.29%	0.72%	8.08E-02	3.54E-01	7.50E-04	3.28E-03
Gas Connection VOC's:	4.40E-04	29	38.85%	0.62%	4.96E-03	2.17E-02	7.88E-05	3.45E-04
Light Oil Connection VOC's:	4.62E-04	29	77.29%	0.72%	1.04E-02	4.54E-02	9.61E-05	4.21E-04
Gas Flange VOC's:	8.58E-04	34	38.85%	0.62%	1.13E-02	4.96E-02	1.80E-04	7.89E-04
Light Oil Flange VOC's:	2.42E-04	34	77.29%	0.72%	6.36E-03	2.79E-02	5.90E-05	2.59E-04
Gas Other VOC's	1.94E-02	1	38.85%	0.62%	7.54E-03	3.30E-02	1.20E-04	5.25E-04
Light Oil Other VOC's	1.65E-02	1	77.29%	0.72%	1.28E-02	5.59E-02	1.18E-04	5.18E-04
Light Oil Service Total Emissions:					1.10E-01	4.83E-01	1.02E-03	4.48E-03
Gas Service Total Emissions:					9.69E-02	4.24E-01	1.54E-03	6.75E-03
Single Well Total Emissions:					0.21	0.91	2.56E-03	1.12E-02
Total Number of Wells:	1	Total Emission (tons/yr):			0.21	0.91	0.00	0.01

^aReferenced EPA Protocol for Equipment Leak Emission Estimates, Table 2-4: Oil and Gas Production Operations Average Emission Factors

^bComponent count based upon 40 CFR 98 Table W-1C and applying a safety factor of 1.5 (rounding up to the next whole number).

^cConstituent Weight % values for gas components are based on Casing Head Gas values

^dConstituent Weight % values for heavy oil components are based on Tank Vapor values

Individual Constituent Components	HAP Fraction, Weight Percentage		Emission Rate, (lbs/hr)		Emission Rate, (tons/yr)		Single Well Total Emissions		Andeavor CDP	
	Light Oil Service ^e	Gas Service ^f	Light Oil Service	Gas Service	Light Oil Service	Gas Service	lbs/hr	tons/yr	lbs/hr	tons/yr
Total VOCs	77.29%	38.85%	1.10E-01	9.69E-02	4.83E-01	4.24E-01	2.07E-01	9.07E-01	0.21	0.91
Total HAPS	0.72%	0.62%	1.02E-03	1.54E-03	4.48E-03	6.75E-03	2.56E-03	1.12E-02	0.00	0.01
Benzene	0.02%	0.03%	2.65E-05	6.79E-05	1.16E-04	2.97E-04	9.44E-05	4.14E-04	0.00	0.00
E-Benzene	0.002%	0.00%	2.52E-06	9.82E-07	1.10E-05	4.30E-06	3.50E-06	1.53E-05	0.00	0.00
Toluene	0.01%	0.01%	1.88E-05	3.58E-05	8.22E-05	1.57E-04	5.46E-05	2.39E-04	0.00	0.00
n-Hexane	0.61%	0.48%	8.76E-04	1.19E-03	3.84E-03	5.23E-03	2.07E-03	9.07E-03	0.00	0.01
Xylene	0.01%	0.01%	1.55E-05	1.47E-05	6.78E-05	6.45E-05	3.02E-05	1.32E-04	0.00	0.00
2,2,4 - Trimethylpentane	0.06%	0.09%	8.37E-05	2.26E-04	3.67E-04	9.90E-04	3.10E-04	1.36E-03	0.00	0.00
CO ₂	0.23%	1.01%	3.29E-04	2.52E-03	1.44E-03	1.11E-02	2.85E-03	1.25E-02	0.00	0.01
CH ₄	1.59%	31.80%	2.27E-03	7.93E-02	9.94E-03	3.47E-01	8.16E-02	3.57E-01	0.08	0.36

^eConstituent Weight % values for light oil components are based on Tank Vapor values

^fConstituent Weight % values for gas components are based on Casing Head Gas values

Field Name	Gas Analysis Data			Gas Analysis Composition (Mol %)																		
	Heating Value (Btu/scf)	MW (lb/lbmol)	Specific Gravity	CO2 (Mole%)	Nitrogen (Mole%)	H2O (Mole%)	H2S (Mole%)	O2 (Mole %)	Helium (Mole%)	Methane (Mole%)	Ethane (Mole%)	Propane (Mole%)	I-Butane (Mole%)	N-Butane (Mole%)	I-Pentane (Mole%)	N-Pentane (Mole%)	Hexanes (Mole%)	Heptane (Mole%)	Octane (Mole%)	Benzene (Mole%)	Toluene (Mole%)	E-Benzene (Mole%)
Molecular Weights -->	NA	NA	NA	44.010	28.013	18.015	34.081	32.000	4.000	16.043	30.069	44.096	58.122	58.122	72.149	72.149	86.180	101.210	114.230	78.112	92.140	106.170
Van Hook	1467.10	26.78	0.927	0.6200	5.5409	0.0000	0.0000	0.0000	0.0000	53.4610	20.2482	13.0570	1.2329	3.7912	0.5556	0.7723	0.4067	0.2906	0.0269	0.0094	0.0042	0.0001

				Weight %																							
Xylenes (Mole%)	n-Hexane (Mole%)	224Tri- methyl pentane (Mole%)	Vapor Weight (lb/lb-mol)	CO2 wt%	N2 wt%	H2O wt%	H2S wt%	O2 wt%	He wt%	CH4 wt%	C2 wt%	C3 wt%	i-C4 wt%	n-C4 wt%	i-C5 wt%	n-C5 wt%	C6 wt%	C7 wt%	C8 wt%	Benzene wt%	Toluene wt%	E-Benzene wt%	Xylenes wt%	n-Hexane wt%	2,2,4-TMP wt%	VOC wt%	HAP wt%
106.160	86.180	114.230	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0.0015	0.1499	0.0214	26.97	1.01	5.76	0.00	0.00	0.00	0.00	31.80	22.58	21.35	2.66	8.17	1.49	2.07	1.30	1.09	0.11	0.03	0.01	0.00	0.01	0.48	0.09	38.85	0.6176

[illegible]

Mode of Operation List		1212 Months	Engine Type Emission Factors (Note: Tier 1-4 and Subpart JJJJ do not have emission factors for some criteria pollutants and all HAPs. See color coding here for sources of those factors on those engine types, 49 CFR 98 Subpart C, Consolidated Emission Tables. All units are in ghp-hr except for those taken from AP-42 and 40 CFR 98 Subpart C which are in lbm/lbmU)														
			NOx	CO	VOC	PM	SO2	HCHO	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	CO2	CH4	N2O	
Submerged loading of a clean cargo tank	Submerged loading, dedicated normal service	1/31/2013	7.3	6.0	0.6	0.7	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Submerged loading, dedicated vapor balance service	2/28/2014	6.6	4.9	0.3	0.6	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Flash Gas Method, Default Bakken EF	3/31/2014	6.6	4.1	0.5	0.6	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Flash Gas Method, Direct Measurement	4/30/2014	6.9	0.05	0.35	0.31	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Flash Gas Method, Representative Average	5/31/2014	6.9	0.05	0.35	0.31	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Vapor Recovery Unit or Oil Balancer	6/30/2014	6.9	8.5	1.0	0.4	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Enclosed Smokeless Combustor	7/31/2014	6.9	8.5	1.0	0.4	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Utility Flare or Other 98% DRE Device	8/31/2014	6.9	8.5	1.0	0.4	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Ground Pit Flare	9/30/2014	6.9	8.5	1.0	0.4	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Ground Pit Flare	10/31/2014	6.9	8.5	1.0	0.4	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
Routed exhaust back into closed loop system	Enclosed Smokeless Combustor	11/30/2014	6.2	4.9	0.4	0.6	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Utility Flare or Other 98% DRE Device	12/31/2014	6.2	4.1	0.4	0.4	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Routed exhaust to a combustion device	1/31/2015	6.2	3.7	0.6	0.3	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Enclosed Smokeless Combustor	2/28/2015	4.6	3.7	0.4	0.2	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Utility Flare or Other 98% DRE Device	3/31/2015	4.6	2.6	0.4	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Enclosed Smokeless Combustor	4/30/2015	4.4	2.6	0.4	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Utility Flare or Other 98% DRE Device	5/31/2015	4.4	2.6	0.4	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Ground Pit Flare	6/30/2015	4.4	2.6	0.4	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Connected to sales line	7/31/2015	3.2	3.7	0.3	0.3	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Oil is hauled by truck	8/31/2015	2.6	3.7	0.2	0.2	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
Oil is sold through LACT	Oil is hauled by truck	9/30/2015	2.6	2.6	0.2	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Oil is sold through LACT	10/31/2015	2.6	2.6	0.2	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Oil Hauled by Truck	11/30/2015	2.6	2.6	0.2	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Oil sold through LACT	12/31/2015	2.2	4.9	0.4	0.3	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Engine Fuel Types	1/31/2016	3.2	4.1	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Diesel	2/28/2016	3.2	4.1	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Natural Gas	3/31/2016	3.2	4.1	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Gasoline	4/30/2016	3.2	3.7	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Bioethanol	5/31/2016	3.2	3.7	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	Conversion Factors	6/30/2016	3.2	3.7	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
Conversion Factors	gph	2005	3.2	3.7	0.3	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	gph	453.59	0.3	3.7	0.1	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/hr	8760	0.3	3.7	0.1	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/hr	379	0.3	2.6	0.1	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/day	24	0.6	2.6	0.2	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/month	1.00E+06	2.6	2.6	0.3	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/month	1.00E+06	0.6	2.6	0.3	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/month	1000	2.6	2.6	0.3	0.1	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	gal/bbl	42	4.41	0.05	0.35	0.31	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
	lb/1000 gal	1000	2.0	4.0	1.0	0.0	0.29	0.07	9.33E-04	4.05E-04	-	2.85E-04	-	34.038144	1.36E-03	2.72E-04	
Loadout Factors (AP42)	lb/hr	365	1.0	2.0	0.7	0.0431	5.85E-04	5.52E-02	1.94E-03	9.63E-03	1.05E-04	2.85E-04	4.45E-04	24.049872	4.54E-04	4.54E-05	
	lb/month	60	10	387	10	0.0431	5.85E-04	5.52E-02	1.94E-03	9.63E-03	1.05E-04	2.85E-04	4.45E-04	24.049872	4.54E-04	4.54E-05	
	Natural Gas, NPS Subpart JJJJ Emergency Generator (10, 387, 10), 25LB		2.0	4.0	1.0	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	Saturation Factor	0.5	1.0	2.0	0.7	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	0.6	1	10	387	10	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	0.8	1	10	2.0	0.7	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	1	1	10	2.0	0.7	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	Vapor Pressure	2.3 psia	10	387	10	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	Equation Coefficient	12.46	10	387	10	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	Load Rate	160 lb/hr	3.17	5.07E-01	1.20E-01	0.0431	5.85E-04	5.52E-02	1.94E-03	9.63E-03	1.05E-04	2.85E-04	4.45E-04	24.049872	4.54E-04	4.54E-05	
Plant Emission Factors	Load Time	1 hr	4.08	5.07E-01	1.20E-01	0.009871	5.85E-04	5.25E-02	4.40E-04	4.05E-04	3.97E-05	1.94E-04	1.11E-03	24.049872	4.54E-04	4.54E-05	
	Baseline, AP42		2.27	3.12	2.66E-02	0.0161	5.85E-04	2.66E-02	1.05E-03	5.52E-05	2.46E-05	-	-	24.049872	4.54E-04	4.54E-05	
	NOx	0.008 lbm/lbmU	1.63	0.09	2.1	0.1	0.094	0.07	-	-	-	-	-	24.049872	4.54E-04	4.54E-05	
	CO	0.31 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CO2	120000 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	N2O	2.2 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	CH4	0.002205 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	HAPs	0.002205 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	SO2	0.002205 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	HC	0.002205 lbm/lbmU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Positive Count Factors (with 50% margin)	Equipment Type	Equipment Count	Split Count for LL, Gas	Enter ghp-hr	Enter ghp-hr	Enter ghp-hr	Enter ghp-hr	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	Enter lbm/lbmU	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1	0.18	0.31	0.29	0.07	0.000033	0.00409	0	0.000285	0	34.038144	0.001908	
	Manhead	Valves	8	7.3	1												

**ATTACHMENT E
THREATENED AND ENDANGERED SPECIES
AND HISTORIC PROPERTIES EVALUATION**

INTRODUCTION

This attachment presents the results an evaluation to comply with the Federal Implementation Plan (FIP) for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Section, as required by the U.S. Environmental Protection Agency (USEPA). On behalf of the Van Hook Gathering Services, LLC (VHGS), Ramboll US Corporation (Ramboll) has conducted a desktop evaluation of the potential effects of the planned activities at the Andeavor Central Deliver Point (CDP) (the "Site or Facility") may have on species protected under the Endangered Species Act (ESA) and/or cultural resources protected under the National Historic Preservation Act (NHPA).

PROJECT OVERVIEW

Existing Conditions

The Andeavor Central Point Delivery (CDP) facility is located at the following coordinates within the Fort Berthold Indian Reservation (FBIR), Mountrail County, North Dakota (Lat/Long: 47.877300, - 102.474522). The facility was initially constructed in 2010 and currently consists of an approximately 1.88 acres gravel pad, an access road connecting with 32nd St NW, tanks, pump and meter houses, and two flare stacks.

The Site is located approximately 2.65 miles west of Lake Sakakawea and approximately 0.75 miles northwest of Muskrat Lake.

Planned Activities

Within the existing Andeavor CDP facility footprint, VHGS plans to install an additional flare tip on the existing main flare stack to accommodate increases in productions and changes in operations at the facility ("the Project"). The installation will not involve excavations or trenching. All equipment will be located within previously disturbed areas.

EVALUATION OF THREATENED AND ENDANGERED SPECIES

Previous Environmental Assessments

In 2017, the United States Department of the Interior, Bureau of Indian Affairs (BIA) prepared a Mitigated Programmatic Environmental Assessment (PEA), with the concurrence of the Three Affiliated Tribes (TAT), to evaluate the environmental consequences associated with the drilling of oil and gas wells and development of the associated well pads within the FBIR. The Mitigated PEA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, and the regulations of the Council on Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) parts 1500 through 1508.

Potential impacts of oil and gas projects on sensitive species include disturbance of habitat during construction, disruption of normal behavior patterns (e.g., breeding, migration), collisions of birds and bats with equipment, electrocution from transmission lines, habitat loss, and avoidance of a Site resulting from reduced habitat value. The Mitigated PEA analyzed the current status of 10 T&E species and concluded that incorporation of specific avoidance, minimization, and mitigation measures, detailed within the Mitigated PEA document, would reduce the potential for impacts related to oil and gas activities within FBIR. The federally-listed species evaluated by the Mitigated PEA include: whooping crane (*Grus americana*), interior least tern (*Sterna antillarum athalassos*), piping plover (*Charadrius melodus*), pallid sturgeon (*Scaphirhynchus albus*), gray wolf (*Canis lupus*), black-footed

ferret (*Mustela nigripes*), rufa red knot (*Calidris canutus rufa*), northern long-eared bat (*Myotis septentrionalis*), poweshiek skipperling (*Oarisma poweshiek*), and Dakota skipper (*Hesperia dacotae*).

The Mitigated PEA concluded that the drilling of oil and gas wells and development of the associated well pads may affect, but are unlikely to adversely affect seven federally-listed species, and are unlikely to affect three federally-listed species. Informal consultation with the United States Fish and Wildlife Service (USFWS) during the development of the Mitigated PEA confirmed these effect determinations.

A copy of the Mitigated Finding of No Significant Impact (FONSI) has been included for reference as Appendix A.

USFWS Threatened and Endangered Species

Ramboll conducted a desktop review of publicly-available resources and other provided documentation to evaluate the potential for the Project to affect federally-listed species. An official species list obtained through the USFWS's Information for Planning and Consultation (IPaC, 2018) system identified four threatened and four endangered species have the potential to occur within the vicinity of the Project (Appendix B, Table 1).

The eight T&E species identified by the IPaC system as potentially occurring on-site were previously evaluated under the Mitigated PEA; which concluded that through the inclusion of specific avoidance, minimization, and mitigation measures oil and gas activities within the FBIR may affect, but are unlikely to adversely affect these federally-listed species. Due to the Project's location within a previously disturbed area, the lack of suitable habitat for sensitive species on-site, and the lack of new excavations or trenching suggests that the Project will not impact sensitive resources or their habitats.

USFWS Threatened and Endangered Species Critical Habitat

Ramboll's review of USFWS Critical Habitat spatial data (USFWS 2017) did not identify any federally-protected species with designated habitat areas on-site or within one mile of the Project. Designated Critical Habitat for the piping plover is located over two miles east of the Project along Lake Sakakawea. Impacts from the Project on areas designated as Critical Habitat are not expected.

HISTORIC PROPERTIES REVIEW

Ramboll reviewed publicly-available sources of information on cultural, historical, and tribal areas, including the National Register of Historic Places (NRHP), which catalogues districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology, and engineering. The NRHP is a federal program authorized under the NHPA of 1966, and administered at the state level by the SHPO. The tribal land review was conducted in coordination with Tribal Historic Preservation Office (THPO) within TAT.

A desktop review of the NRHP (NPS 2014) database did not identify any listed properties or locations within 2 miles of the Site. Therefore, no impacts to known cultural resources are expected to occur from on-site activities. Correspondence with SHPO indicated that due to the Project's location within the FBIR, SHPO could not comment on the potential for impacts to cultural resources. At the time of this report a request for a cultural resources review by TAT THPO had been submitted by Ramboll, but a response had not been provided.

CONCLUSION

Based on species-specific information and the lack of ground disturbance proposed by the Project, Ramboll has concluded that the project qualifies for Criterion B under the FIP; not likely to adversely affect listed T&E species or Critical Habitat.

Based on the existing footprint of the facility, the Project will not affect known historic or cultural resources. At the time of this report concurrence had not yet been provided by the TAT THPO.

If sensitive resources are identified on-site during implementation of the Project, VHGS will coordinate with the appropriate agencies.

References

U.S. Department of Interior, National Park Service (NPS). 2014. National Register of Historic Places, online mapper. https://www.nps.gov/nr/research/data_downloads.htm

U.S. Fish and Wildlife Service (USFWS), Information for Planning and Consultation (IPaC). 2018. <https://ecos.fws.gov/ipac/>

U.S. Fish and Wildlife Service (USFWS). 2017. Threatened & Endangered Species Active Critical Habitat Report, online mapper. <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>

Appendices

Appendix A:

U.S. Department of Interior, Bureau of Indian Affairs (BIA). 2017. *Mitigated Finding of No Significant Impact, Mitigated Programmatic Environmental Assessment, Oil and Gas Development on Trust Lands and Minerals, Fort Berthold Indian Reservation, North Dakota*. June 9.

Appendix B:

U.S. Fish and Wildlife. 2018. List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project. Consultation Code: 06E15000-2018-SLI-0190

Table 1. Protected Species with the Potential to Occur at the Andeavor CDP Facility, Mountrail County, North Dakota						
Species		Listing Status ¹		Habitat ⁴	Determination of Effects ⁵	Site-Specific Comments
Common Name	Scientific Name	Federal ²	CH ³			
INVERTEBRATES						
Dakota skipper	<i>Hesperia dacotae</i>	T	N	Primarily found in unplowed native prairie on dry to mesic calcareous gravelly soils. Can occur in moderately grazed prairie pastures.	May affect, but not likely to adversely affect	Previously disturbed site that does not contain suitable habitat.
FISH						
Pallid sturgeon	<i>Scaphirhynchus albus</i>	E	None	Species occupies large riverine habitat with gravel or sandy substrate.	May affect, but not likely to adversely affect	Site does not contain waterways that would be suitable for species.
BIRDS						
Golden Eagle	<i>Aquila chrysaetos</i>	BGEPA	N/A	Nests on cliffs in mountainous and open areas dominated by shrub-steppe communities. Forages in grasslands and shrublands.	May affect, but not likely to adversely affect	Site does not contain suitable nesting or foraging habitat. No golden eagle nests identified within 0.5 miles; according to the Mitigated PEA.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	N/A	Nests near lakes and rivers in forested areas where tall, large-diameter trees are located.	May affect, but not likely to adversely affect	Site does not contain suitable nesting or foraging habitat. Bald eagle nest identified on southwestern edge of Muskrat Lake; greater than 0.5 miles southeast of the Site.
Least tern	<i>Sterna antillarum</i>	E	None	Species nest along riverine sandbars and salt flats. Adults do not require vegetation for cover, but chicks may use sparse vegetation and debris for shade and protection. Along	May affect, but not likely to adversely affect	Site does not contain suitable nesting or foraging habitat. Site is located approximately 2.50 miles west of Lake Sakakawea and approximately 0.75 miles northwest of Muskrat Lake.

Table 1. Protected Species with the Potential to Occur at the Andeavor CDP Facility, Mountrail County, North Dakota

Species		Listing Status ¹		Habitat ⁴	Determination of Effects ⁵	Site-Specific Comments
Common Name	Scientific Name	Federal ²	CH ³			
				river systems, willow (salix spp.) is commonly found near the nesting location. Forages on small fish and insects.		
Piping plover	<i>Charadrius melodus</i>	T	Y	Breeds on shorelines around small lakes and river islands. Suitable breeding habitat includes wide beaches with clumped vegetation. Nonbreeding habitat is typically on sandflats.	May affect, but not likely to adversely affect	Site does not contain suitable nesting or foraging habitat. Site is located approximately 2.50 miles west of designated Critical Habitat located along Lake Sakakawea, and approximately 0.75 miles northwest of Muskrat Lake.
Red knot	<i>Calidris canutus rufa</i>	T	None	Species using the US central flyway may utilize wetlands or lake as stopover habitat.	May affect, but not likely to adversely affect	Site does not contain suitable nesting or foraging habitat. Site is located approximately 2.50 miles west of Lake Sakakawea and approximately 0.75 miles northwest of Muskrat Lake.
Whooping crane	<i>Grus americana</i>	E	N	Habitat includes marshes, shallow lakes, lagoons, salt flats, grain and stubble fields. Primarily in palustrine wetlands.	May affect, but not likely to adversely affect	Site does not contain suitable nesting or foraging habitat. Site is located approximately 2.50 miles west of Lake Sakakawea and approximately 0.75 miles northwest of Muskrat Lake.

Table 1. Protected Species with the Potential to Occur at the Andeavor CDP Facility, Mountrail County, North Dakota

Species		Listing Status ¹		Habitat ⁴	Determination of Effects ⁵	Site-Specific Comments
Common Name	Scientific Name	Federal ²	CH ³			
MAMMALS						
Gray Wolf	<i>Canis lupus</i>	E	N	Habitat generalist and can occupy almost any habitat where adequate prey is available and human-caused mortality is limited.	No effect	Previously disturbed site does not contain suitable habitat. On-site activities not likely to impact species.
Northern long-eared bat	<i>Myotis septentrionalis</i>	T	None	During the summer the species will roost in both live trees and snags. Some may roost in cooler places like caves and mines. Winter habitat consists of caves and mines.	No effect	Previously disturbed site that does not contain suitable habitat. On-site activities not likely to impact species.

FOOTNOTES:

1) Listing Status Codes are: E = Endangered, T = Threatened, BGEPA = Bald and Golden Eagle Protection Act, CH = Critical Habitat, Y = Critical Habitat designated in county of interest, N = No Critical Habitat designated in county of interest, None = No Critical Habitat designated for species, N/A = Critical Habitat not applicable for species

2) Source of Federal Listings: County List - <http://ecos.fws.gov/ipac/>

3) Critical Habitat is only listed if it is present within the Fort Berthold Indian Reservation (Source: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>)

4) Habitat information was obtained from NatureServe Explorer (<http://www.natureserve.org/explorer/>)

5) Determination of Effects consistent with the previous environmental assessments of the Fort Berthold Indian Reservation related to Oil and Gas Development on Trust Lands. The assessment was completed by the Bureau of Indian Affairs in May 2017. See Attachment A for a copy of the June 2017 Mitigated FONSI document.

APPENDIX A
MITIGATED FINDING OF NO SIGNIFICANT IMPACT (FONSI)

Mitigated Finding of No Significant Impact
Mitigated Programmatic Environmental Assessment
Oil and Gas Development on Trust Lands and Minerals
Fort Berthold Indian Reservation, North Dakota

The United States (U.S.) Department of the Interior, Bureau of Indian Affairs (BIA) prepared a Mitigated Programmatic Environmental Assessment (PEA), with the concurrence of the Three Affiliated Tribes (TAT), to evaluate the environmental consequences associated with the drilling of 1,740 oil and gas wells from approximately 435 pads on Fort Berthold Indian Reservation (FBIR). The Mitigated PEA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, and the regulations of the Council on Environmental Quality (CEQ), 40 Code of Federal Regulations (CFR) parts 1500 through 1508. Under the Mitigated PEA, associated federal actions by BIA include determinations of effect regarding environmental resources and positive recommendations to the U.S. Bureau of Land Management (BLM) regarding the Applications for Permit to Drill (APDs).

Proposed Action

The Proposed Action is the granting of right-of-way (ROW)/easement approvals and APD concurrence by the BIA for the drilling of up to 1,740 wells on approximately 435 pads (an average of four wells per pad) for the exploration and production of oil and associated gas over the next 5 years. These wells will be drilled after permissions are granted by the mineral owners, the BIA ROW is issued, and the subsequent APD is approved by the BLM for the Proposed Action. The Proposed Action will include well pads (oil and gas wells), access roads, and pipeline systems and electric utility lines within the ROW. Note that the 5-year timeframe is an estimate and that the proposed development analyzed in the Mitigated PEA could occur over a shorter or longer timeframe. The Mitigated PEA will be evaluated on a yearly basis to determine if the proposed development has been reached. The use of the Mitigated PEA may be extended beyond 5 years depending on the level of development reached. Additionally, BIA will reassess the Mitigated PEA if pertinent changes in federal regulations are identified.

Mitigation Measures Required by BIA for the Proposed Action

Mitigation measures are a required part of the Proposed Action. These measures are considered integral components of the project's design, and necessary for avoiding potential environmental impacts. Some mitigation measures may be modified depending on the specific project area on the FBIR; this will be determined at the onsite meeting. All mitigation measures associated with the Mitigated PEA are included below and/or in Appendix K of the Mitigated PEA.

General

- Prior to the start of construction for any proposed well or facility, a desktop analysis and an onsite meeting will be conducted to discuss the specifics of the proposed development, identify any issues, and to determine appropriate impact avoidance, minimization, reduction, and mitigation measures. If necessary, an alternate location for development may be determined to avoid or reduce impacts to sensitive resources.
- The general siting of oil and gas activities and facilities within FBIR is based on the location of the Bakken Formation underlying trust lands and Lake Sakakawea, but the BIA, BLM, TAT, and affected allottees have discretion in siting the specific location of activities and facilities on trust lands during the preconstruction onsite meeting. The onsite meeting is designed to avoid or manage potential environmental, health and safety, and other effects of oil and gas facilities and activities.
- Construction materials such as topsoil or gravel shall not be removed from federally administered or tribal lands without approval from the BIA.
- All chemicals stored on site will include secondary containments.
- Sites will be kept clean, including trash containment during drilling and completion operations. Portable dumpsters will be used for the disposal of all trash. All trash will be hauled off site and no burying or burning of trash will be allowed.
- Any damage to improvements such as fences, gates, and cattle guards will be repaired in a timely manner through the terms of the oil and gas production companies' (hereon "Operators") Surface Use Agreement.
- The BLM's Onshore Oil and Gas Order No. 2 will be followed in order to incorporate required safeguards for prevention of blowouts and to maintain fluid control during drilling.

Roads

- Existing roads and primitive trails will be evaluated for use prior to the development of new roads.
- Shared use roadways will be utilized between Operators to the greatest extent possible to reduce the amount of new roads required.
- New roads will be designed to minimize impacts to natural resources, avoiding wetlands and cultural resource sites.
- New roads will conform to BLM Gold Book standards.
- Road development will include the following:
 - Roads will conform to topography of land, and
 - Low profile roads with a minimum height will also be recommended.
- Established load restrictions for state and BIA roadways will be followed, and haul permits will be acquired as appropriate.

- Transportation routes and infrastructure will be planned to reduce vehicle density.
- All oil and gas traffic will be required to drive at posted speed limits, and the development of more effective measures to control truck speeds on FBIR roads will be encouraged.
- Drivers will receive traffic safety training that is specifically tailored to the conditions and requirements on the FBIR (Note: All Operators have their own internal safety protocols and requirements for driver training, and each truck driven on the FBIR is required to obtain a license from the MHA Department of Transportation.)

Well Pads

- Drilling of wells from multi-well pads (average of four wells per pad) on 1,280-acre spacing units will be maximized.
- Well pads will be located a minimum of 500 feet from any occupied dwelling and in areas that minimize surface impact unless permission is obtained from the landowner, BIA, and BLM.
- Cut and fill will be kept to a minimum.
- The size of the well pad will be designed to minimize disturbance, as determined at the onsite meeting.
- Irregularly-shaped well pads will be encouraged to avoid impacts and to achieve oil and gas development.
- Closed-loop systems will be used on the FBIR trust lands over which BIA has jurisdiction. No open systems will be allowed.
- If an emergency cuttings pit is approved by the BIA/BLM, after its use is no longer necessary, full reclamation will be completed and all contents and liners will be removed and disposed of at a state-approved offsite disposal facility
- Storage tanks and heater/treaters will be surrounded by an impermeable berm to act as secondary containment to guard against spills (see the Mitigated PEA). The berm will be constructed with sufficient freeboard to contain a 25-year, 24-hour storm event and sized to hold 100 percent of the capacity of the largest storage tank.
- Two-foot earthen berms will be constructed around the entire working surface of all well pads on FBIR on trust lands over which BIA has jurisdiction.
- Construction crews will be required to carry fire extinguishers in the vehicles and/or equipment.
- Pads will be constructed to minimize impacts to drainages, as evaluated and determined at the onsite meeting.

Climate and Air Quality

- Eighty percent of the producing wells will be connected to pipelines within approximately 60 days from the start of construction. The remaining twenty percent of the producing wells will have gas routed to a 98 percent destruction and removal efficiency (DRE) flare (due to

insufficient pipeline infrastructure) (Note: This is a mitigation measure due to unavoidable circumstances in the field.)

- All engines used for the first 3 years will be Tier 2 engines; 5 percent of engines will be Tier 4 in Year 4; and 10 percent will be Tier 4 in Year 5.
- Completion fracturing pump engine stacks and completion blender engines stacks must be at least 25 feet above ground.
- No open pit flares will be allowed except as a backup control (i.e., if an emergency situation arises and is needed for temporary use).
- Road dust will be reduced at 50 percent control efficiency with watering, and through the use of gravel/scoria.
- Operators will comply with the new source performance standards (NSPS).
- There will be selective use of chemical dust suppressants to reduce road dust.
- If the Operators use aggregates from areas with formations identified by the North Dakota Department of Health (NDDH) as likely to contain erionite, the Operators will test those sources prior to use.
- Adaptive management measures will be implemented in response to air quality monitoring for confirmation of the 1-hour nitrogen dioxide (NO₂) modeling results with on the ground NO₂ emissions from oil and gas drilling and completion operations.

Soils

- All topsoil will be identified, salvaged, segregated, and stored for interim reclamation.
- Any woody vegetation will be ground and mixed into the topsoil.
- Interim reclamation and placement of topsoil with prompt re-vegetation is essential.
- Erosion control measures will include diversion ditches, hydro matting, hydro seeding, water bars, and other measures to be implemented during and after construction.
- Other mitigation measures and BIA conditions of approval (COAs) will be addressed in the field during the onsite meeting to include maintenance and dust control.
- All disturbed areas will be re-contoured to their approximate original elevations.
- Surface-disturbing activities in areas of steep slopes (i.e., slopes greater than 20 percent) will be avoided.
- In the event that soil contamination takes place, the event will be reported immediately to the appropriate agency, not limited to the BLM, BIA, U.S. Environmental Protection Agency (EPA), NDDH, and MHA Energy Department. The Operator will complete the required cleanup to the satisfaction of all involved parties.
- During construction, a water truck will be made available and the access roads will be watered or an alternative dust control program will be implemented.

Water and Wetlands

- During road construction near wetlands, additional mitigation measures will be considered to ensure that wetlands adjacent to constructed roads are not impacted by erosion from new road construction or from road upgrading activities. During construction, a sorbent boom will be placed along the entire length of the wetland adjacent to the access road. Regular inspection and maintenance of the mitigation measures will ensure protection of wetlands and streams.
- Soil piles will be strategically placed at the head of any drainage located within the well pad ROW, and/or down gradient of well pad and absorbent booms in adjacent drainages.
- No equipment or vehicles will be allowed within wetlands or the high-water mark of prairie potholes.
- No un-drained basins will be left in the restored landscape (i.e., following interim and final reclamation). Sediment control measures will be applied to water leaving excavated areas and that water will be properly treated to prevent erosion, sedimentation, and deterioration of adjoining water quality.
- No vehicles will be allowed on slopes greater than 25 percent.
- No vehicles will be allowed on ungraded surfaces during periods of saturated soil conditions when surface rutting will occur.
- For the prevention of product overspray, wells within close proximity (1,000 feet to 0.5 mile) to Lake Sakakawea will use stuffing box/deflectors or alternative methods for containment and collection.
- Closed-loop drilling systems will be used on the FBIR trust lands over which BIA has jurisdiction, as defined in the Mitigated PEA.
- Additional dikes will be considered on a case-by-case basis.
- To avoid pooling at the well pad, rain or snowmelt will be diverted around the construction site by a 2-foot earthen berm around the working surface of all well pads on trust lands over which BIA has jurisdiction.
- Projects will not alter stream channels or change drainage patterns.
- Trenchless methods, including boring or horizontal directional drill will be required for wetlands and waterbodies exhibiting an ordinary high water mark as defined by the U.S. Army Corps of Engineers.
- Sensitive surface water mitigation measures:
 - No drilling or production activities within:
 - The first 1,000 feet from Lake Sakakawea at 1,854 feet mean sea level (MSL);
 - The portion of the designated sourcewater Zone A extending to 1,000 feet inland from Lake Sakakawea (1,854 feet MSL) for 15 miles upstream of the Mandaree, Four Bears, Twin Buttes, and White Shield intakes and the southern (new) Parshall intake, including the main stem and tributaries, not to exceed a total

- distance of 15 miles from the intake (This measurement is taken along the normal flow paths of the river and tributaries.);
 - The critical zone extending 1,000 feet inland from Lake Sakakawea (1,854 feet MSL) for 3 miles upstream and 3 miles downstream of the northern Parshall intake; and
 - The designated Zone A extending 1,000 feet inland from Lake Sakakawea (1,854 feet MSL) for 15 miles upstream.
- No drilling or production activities (excluding pipelines and transportation/utility corridors) within 150 feet of wetlands and perennial and intermittent streams (as identified at the onsite meeting).
- Sensitive groundwater mitigation measures:
 - No drilling or production activities (excluding pipelines and transportation/utility corridors) at existing or future public water supply wells within the critical sourcewater or wellhead protection zone identified by the NDDH, or alternatively, a 0.5-mile radius around the wellhead, provided the area is within BIA jurisdiction.
 - No drilling or production activities (excluding pipelines and transportation/utility corridors) at the New Town Public Water Supply System, the wellhead protection area covering a radius of 2,115 feet around a point between Well #1 and Well #2 (NDDH 2002), provided the area is within BIA jurisdiction.
 - The Operator will run a cement bond log on the surface casing to determine if the surface casing is adequate and protective at known shallow and unconfined buried valley/surficial aquifers, (including the East Fork Shell Creek, Missouri River/Lake Sakakawea, New Town, Sanish, and White Shield aquifers) particularly in areas where domestic permitted groundwater wells are used as a source of drinking or irrigation water; on areas within close proximity (0.5 mile) to groundwater intakes for public drinking water supplies; or in any area where a loss of circulation occurs during the installation of surface casing, which could indicate that cement behind surface casing is not adequate to protect drinking water aquifers.
- Surface and Groundwater Monitoring
 - Surface Water Monitoring
 - Operators will conduct surface water monitoring to help detect water quality changes in the event that a spill from an oil and gas well pad location will breach the provided containment and enter nearby tributary and lake water resources. The approach will include sampling at the bottom end of drainages and near public water system intakes to assess whether spill response measures were

effective in preventing migration of contaminants (described further in the Mitigated PEA).

- Groundwater monitoring
 - Operators will obtain appropriate access permissions, approval, and cooperation from the respective owner and/or the TAT to perform groundwater monitoring at any existing domestic water well that is permitted with the TAT, Indian Health Service, and/or the State of North Dakota and located within 0.5 mile of a proposed new oil and gas well in certain portions, as described in the Mitigated PEA.

Vegetation

- Interim reclamation measures include, but are not limited to reduction of cut and fill slopes, redistribution of stockpiled topsoil, and re-seeding of disturbed areas with a native seed mixture. Seeds will come from a BIA/BLM approved source. Additional reclamation methods/measures can be found in the Mitigated PEA.
- The FBIR Noxious Weed Management Plan (Appendix G of the Mitigated PEA) will be implemented to reduce the potential for noxious weeds to become established.
- Noxious weed inventories on the FBIR will be conducted twice a year (spring and fall) at each well pad site and access road. The Operator will be responsible for controlling noxious weeds for the life of the well (Appendix G of the Mitigated PEA).
- Re-vegetation will occur at the first seasonal opportunity, generally after October 15 until the ground is frozen, or before May 15.
- To prevent and suppress forest, brush, or grass fires on leased acreage, the Operator will build or construct fire lines or clear around the well location, as necessary in consultation with BIA and tribal fire management programs, and will maintain fire tools at locations deemed necessary by BIA.
- If forested upland habitat is identified during the onsite meeting, generally BIA will require Operators to leave the habitat intact to the greatest extent possible.
- Identified noxious weed infestations within the FBIR boundary will be treated with a BIA/BLM/EPA approved herbicide or by mechanical means prior to construction to prevent the spread of noxious weed infestations.
- Prior to mobilization onto the FBIR, drilling rigs and associated equipment will be pressure washed or air blasted to prevent the possible transportation of noxious or undesirable vegetation onto FBIR.

- Snow removal activities will be conducted in a manner that does not adversely affect reclaimed areas and areas adjacent to reclaimed areas.
- Erosion control measures will include diversion ditches, hydro matting, hydro seeding, water bars, and other measures to be implemented during and after construction.

Wildlife, Threatened, and Endangered Species

- Bald Eagles (*Haliaeetus leucocephalus*) and Golden Eagles (*Aquila chrysaetos*)
 - Any bald or golden eagle nests identified during annual surveys and/or line of sight surveys will be avoided by a 0.5-mile buffer (for the 0.5-mile avoidance measure, the 2016 survey should be used [Appendix F of the Mitigated PEA]). If no alternatives are available to buffer by 0.5 mile, additional consultation with the U.S. Fish and Wildlife Service (USFWS) will be required, and TAT Fish and Wildlife Division will be notified. The preferred timing for the surveys is between March 1 and May 15; however, surveys may take place at any time when nests are clearly visible.
 - If any eagle nests are found after work begins, all activity will cease, USFWS will be contacted for advice on how to proceed, and the TAT Fish and Wildlife Division will be notified. Any deviations from this measure will require additional USFWS consultation.
- Migratory Birds
 - Measures to move roads or well pads away from active migratory bird nests or habitat will be undertaken when possible and/or construction will be restricted near active nests.
 - If construction occurs from February 1 to July 15, which is considered the breeding season for migratory birds, one of the two mitigation measures identified below will be utilized:
 - Minimization – in order to minimize availability of nesting habitat for ground nesting species, the Operator will mow or grub areas identified as possible suitable migratory bird nesting habitat within the approved ROW prior to February 1, subsequently the approved ROW will be maintained in a degraded state until ground clearing has commenced within the approved ROW; or
 - If the Operator cannot degrade possible suitable migratory bird nesting habitat within the approved ROW prior to February 1 then a site-specific survey will be conducted no greater than 5 days prior to the planned commencement of spring construction ground clearing activities, including mowing and grubbing, to determine if active nests are present. If active nests are found, the USFWS and BIA will be contacted to determine how to proceed, and the TAT Fish and Wildlife Division will be notified.

- Pallid Sturgeon (*Scaphirhynchus albus*)
 - Even though the number of water intake installations within the FBIR is highly speculative and not included in the Proposed Action, the installation and operation of the intakes will follow the same on-siting procedures completed for well pads and will require the proponent to commit to and implement measures identified by USFWS.
- Whooping Crane (*Grus Americana*)
 - If any whooping cranes are sighted within a 1-mile radius of any work site, all construction activities will be modified or curtailed until the bird(s) have left the area, USFWS will be contacted on how to proceed, and the TAT Fish and Wildlife Division will be notified. For this to be successful, BIA will provide an identification guide for on-site personnel.
- Dakota Skipper (*Hesperia dacotae*)
 - Possible high quality prairie habitat, identified from the Habitat Suitability Model (HSM), will be verified via field quantitative vegetation surveys. Field-verified high quality habitat will not be modified or disturbed unless Dakota skipper occupancy surveys result in no detections, per USFWS (2015) requirements.
 - Possible prairie habitat identified from the HSM will be verified via qualitative field ecological system surveys. Follow-up quantitative vegetation surveys, if necessary, will be conducted.
 - Prairie habitat that is possibly disturbed, not likely or not present as identified from the HSM will be verified via qualitative field ecological system surveys.
- Northern Long-eared Bat (*Myotis septentrionalis*)
 - If forested upland habitat is identified during the onsite meeting, generally BIA will require Operators to leave the habitat intact to the greatest extent possible. If any tree (with a diameter of greater than 2 to 3 inches) removal activities cannot be avoided between April and September, then northern long-eared bat surveys will be conducted to confirm absence of the species.
 - If any suitable northern long-eared bat roost sites or possible hibernacula, are identified, or the bat is observed during the onsite meeting, then any steps taken to avoid and minimize disturbance of this habitat will be documented.
- Piping Plover (*Charadrius melodus*)
 - No construction activities will take place within 0.5 mile of piping plover designated critical habitat unless a physical topographic barrier exists to moderate disturbance. An example of the use of a topographic barrier will be construction on a bluff that precludes access and visibility from the shoreline.

- No drilling or production activities within the first 1,000 feet from Lake Sakakawea (1,854 feet MSL). If a physical topographic barrier does not exist from the site selected to 1,000 feet from Lake Sakakawea (1,854 feet MSL), then site surveys to ensure species' absence will be conducted, if the location is within 0.5 mile of Lake Sakakawea (1,854 feet MSL).
- Rufa Red Knot (*Calidris canutus rufa*)
 - No drilling or production activities within the first 1,000 feet from Lake Sakakawea (1,854 feet MSL).
 - No drilling or production activities (excluding pipelines and transportation/utility corridors) within 150 feet from wetlands and perennial and intermittent streams (as identified at the onsite meeting).
- Site-specific wildlife surveys via line transect, line-of-sight, or other methods will be performed. These will include surveys for threatened and endangered species, bald and golden eagles, and migratory birds.
- Suitable mufflers will be used on all internal combustion engines.
- Compressor components that reduce noise will be used.
- Travel will be restricted to approved roadways.
- Wire mesh or grate covers must be placed over any container utilized to collect product/waste.
- All new electric utility lines that are directly associated with the well pads will be buried.
- All other wildlife species will be considered a valuable resource and development activities mitigated appropriately.
- Absent landowner requirements to the contrary, the entire well pad shall be fenced to prevent wildlife and livestock from accessing the site. A cattle guard will be placed in the access road.

Cultural/Archeological

- A file search and consultation with the Tribal Historical Preservation Office (THPO) regarding potential traditional cultural properties and Areas of Native American Concern will be conducted prior to an intensive pedestrian inventory of all development under the Proposed Action.
- Cultural and archeological surveys will be conducted and a report submitted to the BIA for determination.
- A 10-acre block will be inventoried, at a minimum, for each well pad location, and a 200-foot wide corridor will be surveyed, at a minimum, for access road ROWs and utility corridors to the well locations.
- Any eligible and/or unevaluated sites will be avoided by a minimum of 75 feet (as specified by THPO) with additional protective measures as specified by the BIA.
- If a discovery is made, all work will cease and the BIA and THPO will be contacted. Work will not re-commence until written approval is obtained from the BIA.

- If adverse impacts to a historic property were to occur inadvertently, the mitigation measures will typically include data recovery using standard methodologies for archaeological sites, and high quality photo documentation for buildings and structures.
- The BIA has a Plan of Action (Murdy 2015) that will be followed, which outlines the procedures that will be instituted if unidentified human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered.
- The collection of artifacts or cultural resources is prohibited.
- The presence of a qualified cultural resource monitor will be required during all topsoil stripping of access roads and well pads.

Socioeconomics

- Operators will comply with all Tribal Employment Rights Office (TERO) requirements.
- Successful implementation of the institutional responses to oil and gas development-related concerns described in the Mitigated PEA will help avoid, manage, and mitigate potential adverse aspects and enhance beneficial effects of existing development and future development that will be authorized under the Mitigated PEA. These programs, plans, initiatives, and development setbacks are employed by the TAT and the BIA in concert with other federal and state agencies, the affected counties, and in some cases the Operators. Taxes, royalties, fees, and other revenues accruing to the TAT from existing development are currently funding some of these initiatives and similar revenues from future development could be used to continue and expand these initiatives, at the discretion of the Tribal Business Council.

Visual

- Best Management Practices in the BLM's Visual Resource Management for Fluid Minerals Guide (BLM 2007) will be incorporated into the planning and siting process for a project to maintain visual qualities wherever possible. This includes, but is not limited to:
 - Well sites and associated facilities will be painted in earth tones, based on standard colors recommended by the BIA/BLM, to allow them to better blend in with the natural background color of the surrounding landscape;
 - Proper site selection during the preconstruction phase will avoid placement of facilities on ridge tops or near prominent features; siting wells and facilities in areas where natural or artificial features such as topography, vegetation, or an artificial berm may screen the site or facilities from view; and
 - Locating well sites to lie in the background or common views.
- All electric utility lines that are directly associated with the well pads will be buried underground within utility corridors.
- No drilling or production activities within 0.5 mile of the U.S. Army Corps of Engineer designated recreation areas, as defined in the Mitigated PEA.

Utilities

- Permanent pipelines and all electric utility lines (that are directly associated with the well pads) will be buried underground.
- Prior to construction, the Operator will coordinate with the Fort Berthold Water Authority Director to ensure minimization of impacts to existing water distribution pipelines.
- Utility modifications will be identified during design and coordinated with the appropriate utility company. These modifications shall not change the requirement of underground installation or alignments outside approved ROWs.

Health and Safety

- All well pads will be located a minimum of 500 feet from any occupied dwelling.
- A hydrogen sulfide (H₂S) contingency plan will be submitted to the BLM as part of the APD (see example H₂S Plan in Appendix J of the Mitigated PEA).
- Windssocks will be installed at each well location as a visual reference as to the direction from which to approach the well location.
- Signage for possible hazardous intersections will be placed along access roads in appropriate locations.
- All employees and contractors will be required to take a company specific site safety orientation prior to working for the Operators on the FBIR.
- Potential forest, brush, or grass fires on leased acreage will be prevented and/or suppressed by constructing fire lines and clearing around well locations for forest, brush, and grass fire prevention as deemed necessary by the BIA.
- Construction crews will be required to carry fire extinguishers in their vehicles and/or equipment.
- Trees or other sound barriers may be implemented to reduce noise levels.
- Operators will follow county, BIA, and North Dakota Department of Transportation rules and regulations regarding rig moves, frost law, and oversized/overweight loads on state and county roads to maintain safe driving conditions.

Additional TAT Required Mitigation Measures

TAT has implemented additional mitigation measures as outlined below. The tribally initiated mitigation measures are implemented for the sole use and absolute discretion of the tribal governing body. Examples of potential uses of the mitigation fees, at the sole discretion of the TAT, are provided below (authority to set priorities, use, and implementation resides solely with the tribal governing body):

Mitigation Fee 1

- \$100,000 per well on tribal land held in trust.

Mitigation Fee 2

- \$25,000 (minimum) per well pad disturbance fee distributed by percentage ownership of tribal/allotted interests within the potentially affected trust property.
- \$2,500 (minimum) per acre of disturbance for pipeline/road infrastructure required to service the well.
- \$5,000 (minimum) for each additional well drilled from a multi-well pad.

Additional mitigation measures may include:

- TERO fees,
- Improvements in tribal infrastructure (roads/housing),
- Compliance and enforcement personnel for oil and gas activities,
- Tribal natural resources concerns, and
- Additional support services.

TAT has the authority to set additional mitigation measures through tribal resolutions as a sovereign nation. If any mitigation measures within this document are less restrictive than requirements set by tribal resolutions, Operators will be required to consult with the tribal authorities for clarification and seek a waiver before proceeding with the action.

Reasons for a Mitigated Finding of No Significant Impact

In consideration of the analysis documented in the Mitigated PEA and the reasons outlined in this Mitigated Finding of No Significant Impact (FONSI), the Proposed Action will not constitute a major federal action that will significantly affect the human environment. Therefore, an environmental impact statement (EIS) will not be prepared. The determination is based on the following potential impacts and mitigation measures (examples provided below for each resource) required as integral components within the Proposed Action:

Geologic Setting

Oil and gas resources and sand, gravel, and scoria resources used for construction of access roads and well pads will be permanently depleted, which will be an irreversible impact. However, potential impacts resulting from the permanent depletion of sand, gravel, and scoria resources will be local in nature, as the use of these materials will have a minor impact on local agricultural lands. Further, to preclude any potential impacts from erionite (areas identified by the NDDH), the Operators will test aggregates from sources identified in the Mitigated PEA prior to use.

Long term, but minor impacts to topography will result from the excavation of access roads, well pads, and pipelines. To mitigate impacts to topography, all construction will avoid steep slopes and require only minor cutting and filling (except for areas near the Missouri River, Little Missouri River, and around

Lake Sakakawea, where the slopes are generally low and will require modification). Mass wasting could occur during wet cycles on cut and fill slopes along drainages, major roads, access roads, and well pads, possibly resulting in damage to gathering pipelines and utilities buried along ROWs and/or sedimentation of streams and blockage of gullies. However, the required setbacks along the Missouri River, Little Missouri River, and drainages in combination with the site selection process will minimize the potential for mass wasting within individual site selection. Additionally, the potential for mass wasting will be mitigated by proper drainage, providing vegetative cover on fill slopes, enforcing weight restrictions on large vehicles, and proper design of slopes by determining the angle at which the geologic material is stable. With properly installed mitigation measures, the potential for these impacts is reduced.

Climate and Air Quality

Potential impacts to climate and air quality will include an increase in the emissions of criteria pollutants, hazardous air pollutants (HAPs), and fugitive dust. However, results of the dispersion modeling of all criteria pollutants demonstrate compliance with the applicable National Ambient Air Quality Standards (NAAQS) and North Dakota Ambient Air Quality Standards (NDAAQS) and acute HAP modeling impacts were well below the EPA Reference Exposure Levels and Immediately Dangerous to Life or Health values. Results of HAP modeling of potential chronic effects for six HAPs indicate that all values are well below the reference concentrations and incremental cancer risks were well below a 1 per million risk for benzene, ethyl benzene, and formaldehyde. Although these increased emissions are not expected to violate NAAQS, NDAAQS, or other associated air quality standards, mitigation measures will be in place to minimize the overall amount of emissions and associated impacts. For example, 80 percent of producing wells will be connected to pipelines within approximately 60 days from the start of construction; all engines used for the first 3 years will be Tier 2 engines; 5 percent of engines will be Tier 4 in Year 4; and 10 percent will be Tier 4 in Year 5; road dust will be reduced at 50 percent control efficiency with watering, and through the use of gravel/scoria; and Operators will comply with NSPS.

Additionally, air quality monitoring of on-the ground NO₂ emissions from oil and gas drilling and completion operations, will be performed to confirm the 1-hour NO₂ modeling results. If drilling and completions monitoring results from the scheduled monitoring events indicate that actual NO₂ emissions are not in compliance with NAAQS, then additional mitigation (adaptive management) will be required of the Operators. Note, if the scheduled monitoring events provide conflicting evidence, additional events may be scheduled. The following measures may be required individually or in combination:

- Operators will use diesel-fueled non-road engines with greater than a 200 horsepower design rating during drilling and/or completion activities. These engines will meet one of the following two criteria: (1) the engine was manufactured to meet EPA nitrogen oxide (NO_x) emission

standards for Tier 4 non-road diesel engines, or (2) the engine emits NO_x at rates less than or equal to EPA emission standards for Tier 4 non-road diesel engines; or

- Gas-fired or propane-fired engines that meet the emission standards for Tier 4 non-road diesel engines; or
- Reduced total emissions during the completions phase below the modeled emissions necessary to meet the NAAQS; or
- Raising stack heights (in conjunction with one of the three previous bullets).

In addition, the FBIR Federal Implementation Plan, which provides basic air quality regulations for the protection of communities in and adjacent to the FBIR, and 40 CFR 60 Subpart OOOO, which established emission standards and compliance schedules for the control of volatile organic compounds and sulfur dioxide emissions will be followed.

Soil Resources

Potential impacts to soils could include erosion, compaction, and degradation and loss of topsoil (including loss of soil productivity). Measures that will be implemented to reduce potential impacts to soils could include the minimization of cut and fill in specific project areas; reorientation or relocation of proposed facilities to avoid sensitive areas; the stabilization and re-vegetation of soils and topsoil stockpiles; erosion control such as diversion ditches, hydro matting and hydro seeding, and water bars; segregation and storage of topsoil; prompt stabilization, repair, or re-vegetation of eroded or washed out areas; and spill prevention and containment measures. Interim reclamation will considerably reduce the magnitude of potential impacts related to erosion and sedimentation, soil compaction, and loss to topsoil, and successful final reclamation will generally preclude the potential for additional project-related impacts to FBIR soils.

Water Resources

Surface Water Resources

Potential impacts to surface water resources include increased sedimentation of streams and wetland areas and contamination of surface water. However, there are numerous mitigation measures that will be implemented in order to reduce or avoid potential impacts to surface water resources. For example, drilling or production activities will not be allowed or will be limited near sensitive surface water areas; no equipment or vehicles will be allowed within wetlands and the high-water mark of prairie potholes, and no vehicles will be allowed on slopes greater than 25 percent; projects will not alter stream channels or change drainage patterns; and numerous spill prevention and containment measures will be implemented. Additionally, Operators will conduct surface water monitoring in portions of the FBIR (as indicated in the Mitigated PEA) to help detect water quality changes in the event that a spill enters a

nearby tributary and lake water resources. If impacts are detected through surface water monitoring, the Operator will notify the relevant water authorities so they could take precautionary measures if needed. Relevant measures to prevent erosion will also be implemented (e.g., diversion ditches, and prompt stabilization, repair, or vegetation of eroded or washed areas).

Groundwater Resources

The primary potential impact to groundwater resources is contamination, which could result from mixing of groundwater from aquifers of different water quality; aquifer contamination; and infiltration of spilled material. Hydraulic fracturing fluid, which could be a source of potential groundwater contamination, may come in contact with groundwater through two processes: (1) the casing of a well might fail and allow fluids to escape into shallow rock units used for drinking water supplies; and/or (2) accidental spills of hydraulic fracturing fluids or fluids expelled during a fracturing operation might seep into the ground or contaminate surface water. However, standard well construction processes will be implemented, and the Operator will run a cement bond log on the surface casing to determine if the surface casing is adequate and protective in specific situations, including any area where a loss of circulation occurs during the installation of surface casing. In addition, other mitigation measures to protect groundwater resources from potential impacts include the use of closed loop systems, spill prevention and contamination measures, implementing proper hazardous materials management, and using appropriate casing and cementing. Finally, Operators will conduct groundwater monitoring at proposed oil and gas wells within specific areas (as indicated in the Mitigated PEA).

Wetlands

There will be little direct impacts to wetlands as ground-disturbing activities in wetlands will be avoided to the maximum extent possible and protective buffers will be enforced. However, there is the potential for indirect impacts including sedimentation, pollutant discharge, introduction of debris and/or noxious weeds, and/or hazardous material spills that will lead to impairment of the wetland and overall degradation of the aquatic ecosystems. Measures to prevent the potential indirect impacts to wetlands include spill prevention and containment measures; the use of closed-loop systems; appropriate/site-specific erosion control measures; protective buffers that will be enforced for access roads; and the use of trenchless methods, including boring or horizontal directional drill near all waterbodies exhibiting an ordinary high water mark. If a disturbance of a wetland cannot be avoided and the wetland was not noted during the onsite meeting, the Operator will immediately halt construction in that area and notify the BIA for advice on how to proceed. Following notification to the BIA, the Operator will need to request a jurisdictional determination under Section 404 of the Clean Water Act from the U.S. Army Corps of Engineers, and appropriate additional authorization if needed.

Vegetation and Invasive Species

Primary impacts to vegetation within the FBIR will be the removal of topsoil and vegetation, and increases in changes to native upland land cover types, including fragmentation and changes in composition. Long-term impacts to vegetation could include the loss of topsoil integrity or topsoil contamination, which will prolong successful reclamation, and possibly change the ability of the vegetation to return to pre-disturbance composition and productivity. Potential indirect effects could include the increased spread of fugitive dust, fragmentation of vegetative communities, increased surface erosion, introduction of invasive species, and contamination of soils. Measures that will be implemented to avoid or reduce impacts to vegetation include interim and final reclamation, erosion control measures, and spill prevention and containment measures.

The potential introduction and expansion of invasive and/or noxious weeds will also impact vegetation. However, mitigation measures to reduce the impact of invasive and/or noxious weeds will include the implementation of the FBIR Noxious Weed Management Plan, conducting noxious weed inventories twice a year (spring and fall), and treating identified weed infestations with a BIA/BLM/EPA approved herbicide (if advised to do so by the BIA). In addition, the Operator will control noxious weeds for the life of the well.

Wildlife

Impacts to nesting and foraging migratory birds from the Proposed Action could include electric utility line strikes, vehicle collisions, human disturbance, spills of hazardous materials, and a reduction in the overall amount and/or quality of available habitat. However, the use of closed-loop systems, planning transportation to reduce vehicle density, and the use of spill prevention and control measures will reduce and avoid impacts to migratory birds. In addition, if construction were to occur from February 1 to July 15, one of two conservation measures will be conducted to prevent degradation of possible suitable migratory bird nesting habitat.

Primary impacts to bald and golden eagles will occur from disturbance and potential nest abandonment, precluding eagles from becoming established in an area, spills of hazardous materials, and direct mortality from electrocution. However, mitigation measures will be implemented to reduce and avoid impacts to bald and golden eagles. For example, the Operators conducted three annual spring aerial eagle surveys of FBIR to identify nests that will be avoided. Additionally, electric utility lines will be buried and spill prevention and containment measures will be implemented.

The potential impact of greatest concern for large game species is population displacement. However, disturbance will not occur at all potential well pad locations concurrently, and it is anticipated that the

magnitude of population displacement will decrease over time as: (1) the animals have more time to adjust to the operational circumstances, and (2) the extent of the most intensive development activities, will be short-term. Other potential impacts to large game species could include habitat fragmentation and loss, a reduction in available forage, noise and/or visual impacts, and wildlife collisions with vehicles. However, these potential impacts will be mitigated through the use of multi-well pads, well pad expansion, and co-access road use.

Potential impacts to mammals, reptiles, and amphibians could include direct mortality, habitat fragmentation, habitat loss, and exposure to contaminants and hazardous materials. To mitigate for these potential impacts, a desktop review will be conducted before sites are selected; construction activities will be limited during sensitive periods of the year; onsite meetings will be utilized to survey proposed locations and avoid sensitive areas; mufflers will be used on all internal combustion engines; spill prevention and containment measures will be implemented; and exclusionary devices such as fencing will be required to enclose each well pad.

Potential impacts to fisheries could include direct mortality, a decrease in the quality and/or quantity of habitat, increased fishing pressure, noise, and exposure to contaminants and hazardous materials. These potential impacts will be mitigated through the use of spill prevention and containment measures, the use of closed-loop systems, erosion control measures, and complete avoidance of the Missouri River, Little Missouri River, and Lake Sakakawea (1,854 feet MSL).

Threatened, Endangered, and Candidate Species

Potential impacts to whooping cranes include collisions with electric utility lines, loss of migration habitat, and effects of spills of hazardous materials or produced oil. To mitigate for these potential impacts, all new electric utility lines that are directly associated with the well pads will be buried and spill prevention and containment measures will be implemented. If during construction, a whooping crane is sighted within 1 mile of a well pad or its associated facilities, all construction activities will be modified or curtailed until the bird(s) have left the area and USFWS will be contacted on how to proceed and the TAT Fish and Wildlife Division will be notified.

The primary impacts from the Proposed Action to piping plovers, least terns, and rufa red knots, will occur primarily from habitat degradation, habitat loss, and disturbance from increased personnel in the area. Other potential impacts include spills, collisions with vehicles, and increased predation. To mitigate for these potential impacts, multi-well pads, well pad expansion, and co-access road use will be used to the greatest extent possible and spill prevention and containment measures will be implemented. No construction activities will take place within 0.5 mile of piping plover designated critical habitat

unless a physical topographic barrier exists to moderate disturbance and no drilling or production activities within the first 1,000 feet from Lake Sakakawea (1,854 feet MSL). If a selected site location is within 0.5 mile of Lake Sakakawea (1,854 feet MSL), and if a physical topographic barrier does not exist from the site to 1,000 feet from Lake Sakakawea (1,854 feet MSL), then site surveys to ensure species' absence will be conducted.

One of the impacts to pallid sturgeon is the potential effect from oil and gas related spills; however, spill prevention and containment measures will be implemented and followed. Water usage may also affect pallid sturgeon by altering water levels and flows; although this is not anticipated to impact pallid sturgeon under the Proposed Action.

The greatest potential impact to the Dakota skipper and northern long-eared bat is the loss or degradation of habitat. Other potential impacts include introduction of noxious weeds and direct mortality. However, interim and final reclamation of disturbed areas will mitigate the potential for impacts and prevention and control of noxious weeds will be required. Additionally, to prevent Dakota skipper habitat impacts, possible high quality prairie habitat, identified from the HSM, will be verified via field quantitative vegetation surveys and will not be modified or disturbed unless Dakota skipper occupancy surveys result in no detections. Possible prairie habitat identified from the HSM will be verified via qualitative field ecological system surveys and follow-up quantitative vegetation surveys, if necessary, will be conducted. To prevent northern long-eared bat habitat impacts, if forested upland habitat is identified during the onsite meeting, generally, habitat will be left intact to the greatest extent possible. Additionally, northern long-eared bat surveys will be conducted to confirm absence of the species if any tree (with a diameter of greater than 2 to 3 inches) removal activities cannot be avoided between April and September. If suitable northern long-eared bat roost sites, possible hibernacula, are identified, or the bat is observed during the onsite meeting, then any steps taken to avoid and minimize disturbance of this habitat will be documented.

The USFWS concluded informal consultation in regards to the Proposed Action on June 4, 2014, and December 3, 2015, and is in agreement with the analysis completed for threatened, endangered, and candidate species.

Cultural Resources

Potential impacts to cultural resources could include direct physical impacts to a building, structure, site, or object, such as destruction of or damage to archaeological and historical resources; erosion of cultural resource properties; siltation resulting in burying or degradation of cultural resource sites; and visual impacts to historic buildings, structures, or prehistoric rock art sites. Potential indirect impacts could

include damage or destruction of cultural resources as a result of increased human activity in an otherwise remote area. Potential long-term impacts could include vandalism of cultural resources and unauthorized collection of cultural resources at archaeological sites. Mitigation measures to reduce or avoid these impacts include conducting file searches and cultural surveys, onsite meetings, consultation with the THPO, and avoidance of cultural sites by a minimum of 75 feet (as specified by THPO).

Socioeconomics

Potential socioeconomic impacts include spurred economic growth; population growth; increased demand for temporary and long-term housing; increased and sustained employment opportunities including the associated additional wage and salary income and fringe benefits; increased demand for community infrastructure, public utilities, and services; and considerable revenue generation for that TAT and State of North Dakota, and royalty income for allottees who have leased lands from which production occurs. The increased and sustained employment opportunities will be a substantial economic benefit. However, the other impacts, such as the increased demand for community infrastructure, public utilities, and services, could result in high levels of traffic, road damage, highway safety, hazardous material spills and illegal dumping, rising housing costs, cost of living increases, and potential increases in crime. Nonetheless, numerous mitigation measures will be implemented to reduce and avoid these impacts. For example, spill prevention and containment measures will be implemented and transportation planning will be utilized to decrease vehicle density.

Environmental Justice

In general, the environmental, health and safety, and other effects of past, ongoing, and future oil and gas development are undifferentiated for residents of the FBIR and residents of the Bakken Formation development area outside of the FBIR. Conversely, the Proposed Action will also provide enhanced opportunities and resources to address the lack of employment opportunity, poverty, low-income housing, and other persistent socioeconomic issues on the FBIR, which will be beneficial impacts.

Land Use

The primary potential impact to land use will be an increase in the amount of developed land on the FBIR. This impact will affect residential land use patterns, the amount of grazing land, and the amount of land used for oil and gas exploration and development. However, to reduce and avoid these impacts, mitigation measures will be implemented, including interim and final reclamation requirements; site selection requirements and buffers for well pad development; shared road use agreements; and reduced vehicle density through transportation planning will occur.

Recreation

Potential impacts to recreation will include a potential increase and/or decrease in recreational opportunities due to improved or restricted access to certain areas on the FBIR; a potential decrease in the appeal of the setting of areas near development due to noise and human presence; and a potential increase and/or decrease in the quality and success of hunting experiences due to temporary displacement from certain locations, increased travel times to hunting locations, and increased access to different hunting areas. These potential impacts will be mitigated through interim and final reclamation, and the use of suitable mufflers on all internal combustion engines and compressor components to reduce noise.

Visual Resources

Potential impacts to visual resources could include a reduction in the overall scenic quality of the area, including alterations to the rural character of the FBIR, and an increase in the industrial nature of the FBIR. Additionally, other potential impacts include a reduced view of the night sky due to the presence of artificial lighting and flaring, and the introduction of new lines, colors, forms, and textures. However, mitigation measures will be in place to reduce and avoid these impacts. For example, the use of multi-well pads will reduce the total amount of surface disturbance, the removal of natural vegetation will be minimized, and local topography will be used to screen development from public view, where feasible. Additionally, no drilling or production activities will occur within 0.5 mile of U.S. Army Corps of Engineers designated recreation areas (as defined in the Mitigated PEA).

Roads and Traffic

Potential impacts to roads and traffic include an increase in the amount of roads on the FBIR, increased traffic, an increase in the potential for traffic accidents, and a decrease in road conditions. Mitigation measures will be in place to reduce and avoid these impacts. For example, planned oil, gas, and water pipelines will reduce the amount of traffic and/or the amount of miles traveled by trucks. In addition, road use agreements between individual Operators and the TAT for specific BIA routes and tribal roads will address issues of damage to roads from oil and gas traffic.

Public Health and Safety

Potential impacts to public health and safety will include the potential release of H₂S, the potential for hazardous materials and/or hazardous waste spills, an increase in the presence of hazardous sites on the FBIR, an increase in the potential for fires, and an increase in noise levels. However, mitigation measures will be in place to reduce and avoid these impacts. For example, all Operators on the FBIR will be required to maintain an H₂S Contingency Plan to provide safety measures and response procedures to prevent accidental releases of H₂S and protect individuals from exposure. Additionally, the maximum number of chemical containers on location will not exceed two per chemical type unless authorized by the BIA prior to use or storage on site. Fences will also be erected and maintained on well pad locations,

fires will be prevented and suppressed, and trees and noise walls may be implemented to further reduce noise levels.

Monitoring Mitigation Commitments

The BIA will develop and implement a mitigation monitoring plan (hereon “plan”) within 30 days. The BIA recognizes that monitoring is fundamental for ensuring the implementation and effectiveness of mitigation commitments and identifying trends and possible means for improvement. The plan will allow decision makers to adapt to changing circumstances within the Proposed Action. Additionally, this plan is an adaptive management technique that will ensure that mitigation measures identified within the Mitigated PEA are effective in reducing the identified potential environmental impacts and serves as a mechanism to change mitigation measures based on the compliance and monitoring results. The plan will be implemented as a concerted effort by the BIA, BLM, TAT, additional federal agencies (as needed), and owners/Operators.

The onsite meeting is a required component of the well development process that provides opportunities to identify potential issues, review survey results, and identify remedies to those issues early in the process for individual sites. The onsite meeting is the initial step to ensuring that the mitigation measures committed to as part of the project design in the Mitigated PEA are identified and incorporated in project development. All parties involved in the well development process will meet at the proposed project location to discuss the specifics of the proposed development, including potential issues, the number of well(s) proposed, layout of the well pad, general information about the wells(s), timing (season) of construction and operations, and to determine appropriate impact avoidance, limitation, and mitigation measures. In addition, during the onsite, the onsite checklist will be completed to determine if the oil and gas proposal is covered under the Mitigated PEA. The checklist accounts for potential impacts to sensitive resources, for example, distances to sensitive features (e.g., wetlands, drainages, wooded draws, and potential wildlife habitat); it also addresses the general topography of the site, visual resource issues, presence of noxious weeds, topsoil thickness, potential erosion concerns, and reclamation required by the BIA.

An additional commitment by BIA is the implementation of air quality monitoring for confirmation of the 1-hour NO₂ modeling results with on-the ground NO₂ emissions from oil and gas drilling and completion operations. The monitoring will be completed by a contractor under the direction of BIA and BLM from 2016 through 2018 with upwind and/or downwind monitors. If drilling and completions monitoring results from the scheduled monitoring events indicate that actual NO₂ emissions are not in compliance with NAAQS, then additional mitigation will be required of the Operators.

The BIA has committed to these mitigation measures as part of the Proposed Action, which are further supported by the development and implementation of the plan. The BIA will reassess the Mitigated PEA at the end of the 5-year period or when anticipated development is reached in order to determine if revisions are necessary to address an under- or over-prediction of expected development. The BIA will also reassess the Mitigated PEA if pertinent changes in federal regulations are identified. The BIA will track and conduct yearly reviews of all activities (including mitigation measures) conducted under the Mitigated PEA, and prepare a yearly summary report and conduct an annual meeting between November and January (for the length of the validity of the Mitigated PEA). The BIA will also be available to confirm and discuss the findings of the yearly summary report with the TAT and the BLM, upon request.

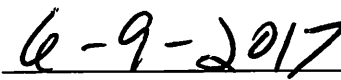
Additionally, as agreed upon at the conclusion of the USFWS informal consultation, the BIA will track and conduct yearly reviews of all activities conducted under the Programmatic Biological Assessment and Biological Evaluation (BABE) and Programmatic BABE Addendum (BIA 2014 and 2015). The BIA will prepare a yearly summary report and conduct an annual meeting between November and January (for the length of the validity of the BABE).

Determination

In accordance with NEPA and CEQ regulations 40 CFR parts 1500-1508, I have determined that the proposed project with the required COAs and mitigation measures will not significantly affect the quality of the human or natural environment. No EIS is required for any portion of the proposed activities.



Regional Director



Date

Literature Cited:

- Murdy, C. 2015. On the treatment of inadvertent discoveries of historic properties on Fort Berthold Reservation, North Dakota. U.S. Bureau of Indian Affairs Great Plains Region, Aberdeen, South Dakota.
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- U.S. Bureau of Land Management (BLM). 2007. Visual resource management for fluid minerals, best management practices: better ways for achieving results. Washington, D.C.: Bureau of Land Management.
- U.S. Fish and Wildlife Service (USFWS). 2015. Dakota skipper guidance for interagency cooperation under Section 7(a)(2) of the Endangered Species Act. U.S. Fish and Wildlife Service, Regions 3 and 6. February 2015.

APPENDIX B
UFSWS LIST OF THREATENED AND ENAGERED SPECIES



United States Department of the Interior

FISH AND WILDLIFE SERVICE
North Dakota Ecological Services Field Office
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Bismarck, ND 58501-7926

Phone: (701) 250-4481 Fax: (701) 355-8513

[http://www.fws.gov/northdakotafieldoffice/endspecies/
endangered_species.htm](http://www.fws.gov/northdakotafieldoffice/endspecies/endangered_species.htm)



In Reply Refer To:

April 06, 2018

Consultation Code: 06E15000-2018-SLI-0190

Event Code: 06E15000-2018-E-00292

Project Name: Flare Modification

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
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Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

North Dakota Ecological Services Field Office

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Bismarck, ND 58501-7926

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Project Summary

Consultation Code: 06E15000-2018-SLI-0190

Event Code: 06E15000-2018-E-00292

Project Name: Flare Modification

Project Type: OIL OR GAS

Project Description: Within the existing facility footprint, the Project plans to install an additional flare tip on the existing main flare stack to accommodate increases in productions and changes in operations at the facility. The installation will not involve excavations or trenching. All equipment will be located within previously disturbed areas.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/47.87730109368526N102.47446278585292W>



Counties: Mountrail, ND

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Wolf <i>Canis lupus</i> Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico. There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/4488	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Least Tern <i>Sterna antillarum</i> Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered
Piping Plover <i>Charadrius melodus</i> Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot <i>Calidris canutus rufa</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane <i>Grus americana</i> Population: Wherever found, except where listed as an experimental population There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Fishes

NAME	STATUS
Pallid Sturgeon <i>Scaphirhynchus albus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7162	Endangered

Insects

NAME	STATUS
Dakota Skipper <i>Hesperia dacotae</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1028	Threatened

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

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1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see maps of where birders and the general public have sighted birds in and around your project area, visit E-bird tools such as the [E-bird data mapping tool](#) (search for the name of a bird on your list to see specific locations where that bird has been reported to occur within your project area over a certain timeframe) and the [E-bird Explore Data Tool](#) (perform a query to see a list of all birds sighted in your county or region and within a certain timeframe). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Bittern <i>Botaurus lentiginosus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6582	Breeds Apr 1 to Aug 31
Baird's Sparrow <i>Ammodramus bairdii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5113	Breeds May 20 to Aug 15

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern <i>Chlidonias niger</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Chestnut-collared Longspur <i>Calcarius ornatus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 10
Franklin's Gull <i>Leucophaeus pipixcan</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Hudsonian Godwit <i>Limosa haemastica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Long-billed Curlew <i>Numenius americanus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5511	Breeds Apr 1 to Jul 31
Marbled Godwit <i>Limosa fedoa</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds May 1 to Jul 31
Nelson's Sparrow <i>Ammodramus nelsoni</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Sep 5

NAME	BREEDING SEASON
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Short-billed Dowitcher <i>Limnodromus griseus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Smith's Longspur <i>Calcarius pictus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Sprague's Pipit <i>Anthus spragueii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8964	Breeds May 10 to Aug 31
Willet <i>Tringa semipalmata</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum

probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

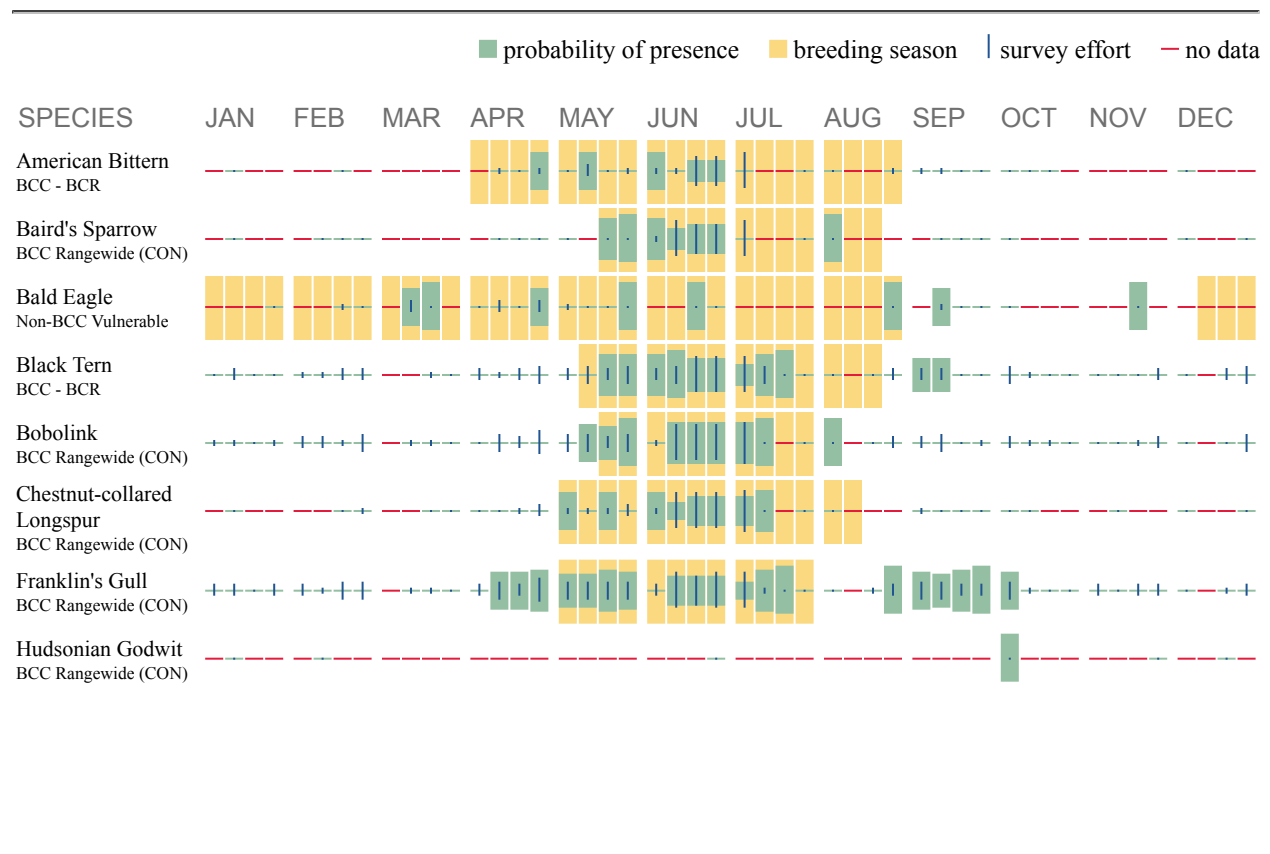
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

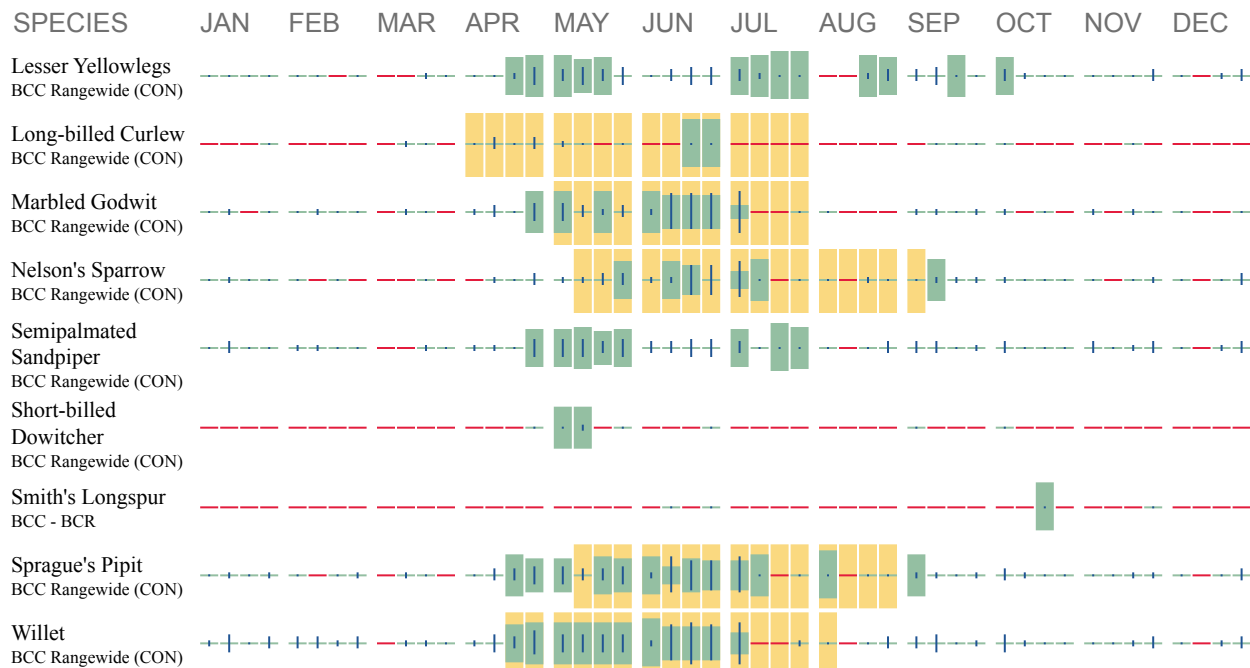
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.





Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the counties which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird entry on your migratory bird species list indicates a breeding season, it is probable that the bird breeds in your project's counties at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
 2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
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3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the BGEPA should such impacts occur.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.
